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ABSTRACT

This issue of "Directions," a publication for updating academic, professional, career, and research activities, contains thirteen articles focusing on the education of hearing impaired children with additional disabilities. The following authors and titles are represented: "Multihandicapped Hearing-Impaired Students--Problems in Identification and Definition" (T. Jones); "Psychological Evaluation of Multihandicapped Deaf and Hard-of-Hearing Youth" (McC. Vernon, B. Alles); "Developing Awareness and Acceptance of Multihandicapped Hearing-Impaired Students" (E. Shroyer); "Linking Classroom and Residence Hall: A Team Approach at the California School for the Deaf, Riverside" (M. Salem, L. Laputz); "The Special Education Unit Model at the Lexington School for the Deaf" (T. Colasuonno); "The Education and Placement of Deaf-Blind Students: Current Issues and Recommendations" (M. Orlansky); "Future Trends in Deaf-Blind Education--Revisited" (H. Baud, D. Tweedie); "A Look at the Cognitive and Language Development of Deaf-Blind Children" (C. Jensema); "Investigating the Cognitive Processes of Deaf-Blind Students through Auditory and Visual Channels" (A. Smisko, T. Valentine); "A Three-Year Study of Behavioral Change in Deaf-Blind Children" (W. Curtis); "Training for Life: A Living and Work Program for Deaf-Blind Youth" (S. Descarage); Communication Methods and Devices for Deaf-Blind Persons" (C. Jensema); and "The SPECIALNET Communication and Information Network: An Application of Computer-Assisted Telecommunications in Special Education" (R. Campbell). (CL)

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Gallaudet College

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Issues in the Education of Multihandicapped Hearing-Impaired Children

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Corinne K. Jensema
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Purpose

Directions, a publication of Gallaudet College, provides professionals in the field of deafness with information important to the education and welfare of deaf people. *Directions* is a vehicle for disseminating innovative ideas, important papers, significant experience, and validated research findings, primarily originating on Kendall Green but interesting to the profession at large. It will update significant progress in academic studies, professional development, and research areas. The goals of the publication are to: (1) foster the continuing development of theory and practice, and (2) encourage extensive and thorough discussion of problems related to and drawn from such innovation.

Information for Authors

Each issue of *Directions* deals with a single topic identified as significant to the profession at large. *Directions* issues generally are planned by editors or guest editors many months in advance, and most of the articles are solicited from authors who have published original work on the topic. However, from time to time the journal solicits manuscripts on a particular topic from individuals outside the College community, either directly or through a call for papers. Manuscripts and editorial correspondence should be sent to Doin E. Hicks, Editor, *Directions*, Gallaudet College, Washington, D.C. 20002.

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For consideration for publication, an original manuscript and two copies must be submitted to the editor. Manuscripts must conform to standards set in the *Publication Manual of the American Psychological Association*, current edition, with respect to such features as:

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- margins (38 mm at top and on left; 25 mm on right, i.e. 1½" & 1")
- abstract (a summary of the article, under 200 words)
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Introduction

Corinne K. Jensema

"A tossed salad" might be an apt metaphor for a program for multihandicapped hearing-impaired children. In a salad, not one ingredient resembles another—a tomato can never be confused with a carrot or a head of lettuce—but they are all in the same bowl. Multihandicapped children are each unique individuals struggling to make sense of experience through the limitations imposed by several handicaps. Impediments to performance are created not by the simple additive impact of each handicap, but by their multiplicative interdependence. For example, a child who is deaf, blind, and mentally retarded experiences language-learning difficulties that reflect the deaf child's lack of exposure to spoken language, the blind child's conceptual limitations, and the mentally retarded child's stunted cognition. Such a child presents educational challenges far different from those posed by a child who is hard of hearing and autistic. Yet, they have been tossed into the same "salad," under the same label, into a program for multihandicapped hearing-impaired children.

The programmatic challenges these children present to the educational community are staggering. The best philosophical thinking and methodological advances in each related field must be integrated and reworked into forms acceptable to the instructional environment of the schools in which these programs are housed. Teachers, dormitory counselors, aides, and administrators are expected to be jacks-of-all-special-education-trades and wizards of ingenuity. They must know how to respond to problems imposed by each of the various handicaps and how to package the whole into a plan that addresses the learning goals of each child. The support of specialized staff, such as speech therapists, physical therapists, occupational therapists, psychologists, and health officials, is invaluable in remediating specific problems. The entire educational/training process is an orchestration of strategies from professionals of disparate fields converging attention on a single young individual.

Recent legislation has brought solutions and further problems to the care and training of these children. Thanks to child-find mandates, many multihandicapped hearing-impaired youngsters who formerly were relegated to back wards and hidden seats in classrooms have been located and reassigned to more appropriate and challenging programs. However, many school officials have balked at the intrusion because they were unprepared to handle the new demands. Some have asserted that these children do not fit their admissions guidelines or historic mission. Everywhere funds are inadequate. State and federal authorities have expressed sympathy but have insisted nonetheless on the placement of these children in public education. Responses from the educational field have run the gamut from insightful and creative to slyly ostracizing.

This issue of *Directions* has provided an opportunity for individuals involved in the education of multihandicapped hearing-impaired children to voice global and specific concerns. Solutions are offered for general programmatic issues; specific instructional strategies are also included. In addition, several outstanding programs have been described so that the reader can get a feel for how the challenge has been met. The last part of the issue is an ERIC search of recent research that may be useful to professionals working with multihandicapped hearing-impaired children.

The appetizer is finished. Enjoy your salad!

Multihandicapped Hearing-Impaired Students: Problems in Identification and Definition

Thomas W. Jones

Interest in the education of hearing-impaired students with additional handicaps has increased greatly in recent years. This increase is evidenced by a surge of articles and books concerned with this topic. Any attempt to plan services for multihandicapped hearing-impaired (MHHI) students or to synthesize and generalize from the presently available literature, however, is hindered by a lack of common terminology and understanding of the characteristics and needs of the students involved. Indeed, some people may use the same term to describe groups of students with almost no common characteristics or may use different terms to describe groups with very similar characteristics! Some authors, however, have consistently emphasized the need for standardized terminology to improve services for multihandicapped hearing-impaired students (e.g., Dibenedetto, 1976; Flathouse, 1979, 1982; Griffing, 1981; Hardy & Bordley, 1973; Leenhouts, 1959; Lennan, 1979). Unfortunately, a variety of problems are evident both in the explicit definitions in use today and in the unwritten definitions implied by professional diagnosis, classification, and placement practices. The purpose of this article is to describe specific problems in identifying MHHI students and to make recommendations for resolving those problems.

Lack of Understanding of Accompanying Handicaps

If any agreement exists in identifying MHHI students, it is that they have a handicap accompanying hearing impairment. Professionals in the area of hearing impairment may have only a vague or limited understanding of the additional handicaps, however. Lennan (1979) reported that educators of the deaf give widely varying responses when asked to define additional handicapping conditions. Cohen (1980) and Flathouse (1979, 1982) have suggested that lack of definition of the behavior or condition being identified confounds interpretation of incidence studies. Such a lack of understanding is unfortunate because specific criteria are available for defining and identifying several handicapping conditions. These criteria are supported and implemented by a large proportion of professionals, e.g., the American Association on Mental Deficiency *Manual on Terminology and Classification in Mental Retardation* (Grossman, 1977). Professionals in the MHHI area should have a clear understanding of a variety of handicaps and their effects on hearing-impaired students.

Probably related to the lack of understanding of additional handicaps is the practice of using the general term *multihandicapped* when a more precise term would be more appropriate and clear. For example, Arkell (1979) labeled her subjects "multiply involved deaf students" but described them functionally as severely to profoundly mentally retarded. Similarly, Mira and Hoffman (1973) appeared to use "multihandicapped deaf-blind children" as a euphemism for "mentally retarded deaf-blind children." The term *mentally retarded* often is considered stigmatizing. Reluctance to apply the term to MHHI students may represent an unconscious effort to eradicate the notion that deafness is synonymous with mental retardation, a frequent error in the history of deaf education (Brannan, Sigelman, & Bensberg, 1975). Today, however, with a clearer understanding of what mental retardation is, correct use of the more precise label—*hearing impaired severely mentally retarded*—could result in more appropriate programming and more realistic expectations for a student.

Determination of Educational Significance

A pervasive theme in articles concerned with identification of MHHI students is that the handicaps accompanying hearing impairment should be educationally significant (see Griffing, 1981). Presently available literature shows two unsatisfactory approaches for determining educational significance of accompanying handicaps: medical diagnosis and failure to succeed in an established program.

Medical Diagnosis

Perhaps the least satisfactory procedure for establishing the educational significance of a handicap (whether it accompanies hearing impairment or not) is for it to be diagnosed and certified by a physician, a professional typically dissociated with the field of education. Many educators, however, agree with this approach. For example, Lennan, (although remarkably educationally oriented regarding other handicapping conditions) recommended that vision impairments be substantiated by an ophthalmologist (1974). Similarly, Hardy and Bordley (1973) and Vernon (1969) related educational considerations for MHHI students to medically diagnosed conditions and etiologies. While medical diagnostic information can be of great value in educational decision making, educators should avoid the fallacy of assuming equivalence between medical conditions and educational needs (Gordon, Appell, & Cooper, 1982). A hearing-impaired student with a confirmed vision impairment may need only minor accommodations in the

"It is necessary that educational diagnosis focus on need rather than disability. . . ."

school setting or none at all. To call such a child multihandicapped for educational programming purposes would be very unnecessary and unjust.

Conversely, many educationally significant needs, such as prevocational training and behavior management, cannot be medically evaluated by physicians. Stevens (1962) proposed a taxonomy for special education in which he recommended a clear distinction between the terms *impairment*, *disability*, and *handicap*. Impairment refers to any defect in tissue; disability refers to loss of function; and handicap refers only to disorders relevant to school and the learning process. As defined by Stevens, handicaps require special education procedures. In the MHHI area, we should be careful that the children we label as MHHI truly have multiple handicaps and not just an impairment or disability in addition to deafness. Thus, a student with Usher's Syndrome should not be considered to be MHHI until the retinitis pigmentosa has progressed, or until the child's psychological needs relative to impending blindness have developed to the point that special education procedures are necessary.

Failure in Established Programs

A second unsatisfactory approach for determining the educationally significant handicaps accompanying deafness is the identification of children who fail in established programs. In some cases such an approach does not even clarify whether a second handicap exists. Haag (1978) described a multihandicapped unit in a residential school that was designed for "deaf students who cannot function in a regular classroom" (p. 475). Even the Education for All Handicapped Children Act (Public Law 94-142, 1975) used failure to succeed in an established program as a criterion for classification as multihandicapped.

> Multihandicapped means concomitant impairments (such as mentally retarded-blind, mentally retarded-orthopedically impaired, etc.), the combination of which causes such severe educational problems that they *cannot be accommodated in special education programs solely for one of the impairments.* [Emphasis added.] (Sect. 121a.5[b] [5])

Two related problems are obvious in using such a criterion to establish educational significance of handicaps accompanying deafness. First, the criterion is exclusionary; that is, it tells us where the student cannot succeed but does not define a handicap or need. Ironically, it effectively restricts educational service options when expanded options may be what MHHI students need. Second, it places the burden of conformity on the students rather than on the program. This could allow hearing-impaired students without accompanying handicaps to be dumped into MHHI classes because teachers believe that they have learning or behavior problems (Lennan, 1974). A failure-to-succeed criterion for MHHI student identification would reinforce teachers who are unwilling to individualize instruction or to adapt otherwise to the needs of individual students.

Appropriate Determination of Educational Significance

In order for a hearing-impaired student to be classified as MHHI, it is necessary to establish that the student has a second educationally significant handicap. It has been explained that neither medical diagnosis nor failure in an established program is sufficient in itself to show that the student is multihandicapped. In determining that a student is multihandicapped, consideration should be given first to why that determination is being made. As with any label, the use of MHHI should be avoided if no benefit can be derived. Labels may be beneficial if they enable appropriate expectations and educational services to be made for students (Kolstoe, 1972). To ensure that the MHHI label is beneficial, it is necessary that educational diagnosis focus on need rather than disability and that a variety of service options be available where the needs may be met.

Assessment of Need

Assessment of the needs of students who may be MHHI is congruent with Lennan's (1974) injunction that we be more concerned with providing individual educational programs for MHHI students than with merely labeling and categorizing them. Assessment of the educational needs of MHHI students should focus on function and adaptability in a variety of settings (Flathouse, 1979; Haag, 1978), and several disciplines should be involved in the evaluation process (Pronovost, Bates, Clasby, Miller, Miller, & Thompson, 1976). Griffing (1981) identified five factors for differentiating MHHI students. These could be considered as parameters of special education needs for MHHI students.

1. *Instructional Objectives.* The MHHI student may need instruction in special curricular areas, e.g., toilet training or orientation and mobility.
2. *Environment of Instruction.* The MHHI student may need specially designed facilities or equipment.
3. *Rate of Instruction.* The MHHI student may learn at an unusual rate or in an unusual sequence.
4. *Methodology.* The MHHI student may need special instructional procedures or materials, e.g., precision teaching.
5. *Staffing.* The MHHI student may require teachers with special com-

"Communication about MHHI children is often confused. . . ."

petencies, ancillary services, or a low staff-student ratio.

Service Options

Identification of MHHI students through assessment of special needs is meaningful only where a range of programs and expertise is available to meet those needs (Connor, 1982). By using the parameters presented by Griffing, educators can identify placement options based on individual students' needs. Flathouse (1979) used staff-student ratios (the staffing parameter) as one variable in defining a least restrictive environment for MHHI students. Connor proposed that program goals (the instructional objectives parameter) be used to decide educational placement options. Naiman (1979) and Pronovost et al. (1976) presented continua of specific placement options for MHHI students. They included self-contained classes for hearing, hearing-impaired, and MHHI students; resource rooms; full, partial, and no integration; and the availability of supportive services. Not only do they show options for instructional environments but also options for objectives, instructional rate, methodology, and staff competencies.

The Problem of Multiple Terminology

Communication about MHHI children is often confused because of the variety of terms that is applied to this population. The federal definition of *severely handicapped* includes children "with two or more serious handicapping conditions such as . . . the cerebral-palsied deaf" (U.S. Office of Education, 1978, p. 449). These are children who obviously have multiple handicaps. The federal definition of *multihandicapped,* (see PL 94-142) however, excludes *deaf-blind* children because of a separate funding pattern. Also, children who are called *hearing impaired/developmentally disabled* (i.e., those having mental retardation, cerebral palsy, epilepsy, or autism in addition to hearing impairment) receive federal funds through other appropriations (Stewart, 1978). What is ironic is that these terms, *severely handicapped, multihandicapped (MHHI), deaf-blind,* and *hearing impaired/developmentally disabled,* may be used to denote children with very similar characteristics and educational needs. Yet, each of the terms has been related to the development of a corpus of knowledge and professional practice which is almost entirely separate from each of the others. Professionals who identify with one network find it difficult to access and benefit from the findings of the others. Extensive services to deaf-blind children in this country, for example, have been in place since 1969 (Brill, 1974) and a tremendous amount of information on educational assessment and programming for these children has been generated (Tweedie & Baud, 1981). Teachers of other handicapped groups often do not realize the applicability of that information to their work.

Heterogeneity and Classification

Anyone who considers the educational needs of MHHI students cannot avoid being impressed with their educational heterogeneity, the wide range of learning characteristics, and the instructional needs these students have (Connor, 1982; Wolf & Anderson, 1969). This is perhaps the most difficult problem in any endeavor concerned with these students, whether it be teacher preparation, identification, or educational decision making. In order to overcome the problem of heterogeneity and to aid in placement and decision making in MHHI programs, several authors have proposed classification schemes for hearing-impaired children with additional handicaps. Others (e.g., Lennan, 1974) have warned against preoccupation with classification. Griffing (1981), however, showed that definition and classification of MHHI students would assist policy makers and educational decision makers in providing appropriate services for this population.

Perhaps the most common way of classifying MHHI students is in terms of their additional handicaps (Craig & Craig, 1981; Cruickshank, 1969; Stewart, 1978; Wolf & Anderson, 1969). Thus, MHHI students would be subdivided into the deaf mentally retarded, deaf-blind, deaf cerebral palsied, etc.

While an additional handicap approach may be useful in reporting incidence data (and even this is questionable), it leaves much to be desired from an educational service-delivery perspective. One problem is that such an approach separates children whose educational needs are truly very similar. This is the case with many deaf-blind and deaf mentally retarded students. Connor (1982) pointed out the fallacy of program planning based on disability categories. A second problem, as previously discussed, is that classification by secondary handicaps fosters the fragmentation of professional knowledge and practice.

Finally, classification by secondary handicaps encourages a related problem—the issue of primary disability. In planning services for MHHI students one may be tempted to ask whether mental retardation (or cerebral palsy, or whatever) affects the child's functioning more significantly than hearing impairment. Should the child be called mentally retarded

"Multiple disabilities interact . . . in such a way that their relative effects cannot be separated."

deaf or deaf mentally retarded? Blind-deaf or deaf-blind? This question is moot. Multiple disabilities interact with each other in such a way that their relative effects cannot be separated (Flathouse, 1979; Griffing, 1981; Moores, 1982). According to Dibenedetto (1976), "presently there is no theoretical or philosophical basis for assigning priority to one handicap over the other" (p. 166). Additionally, the combination of two or more handicaps has a multiplicative rather than additive effect upon a person's functioning (Brill, 1974, p. 239–240).

Other Variables in Classification

Several authors have proposed MHHI classification systems based on variables other than additional handicaps. These systems are summarized in Table 1. The additional variables which are considered include medical needs, inappropriate education, placement, and degree of educational need.

Table 1
Classification Systems for MHHI Students

Functioning Level	Classification Source				
	Bond 1979	Griffing 1981	Lennan 1974	Power & Quigley 1971	Moores 1982
High				Medically remediable	Caused by inappropriate education
	No obvious significant handicaps	Mildly MHHI educational needs			
				Educationally remediable	
	Additional handicap due to exogenous factors	Moderately MHHI educational needs	Benefit from special class placement		
				Educationally adjustable	
	Severe additional handicap	Severely MHHI educational needs	Benefit from special program placement		
Low		Personal care needs	Requiring continuing custodial care		
		Medical care needs			

The difficulties in using medical diagnosis to determine the educational significance of impairments accompanying deafness have already been discussed. Power and Quigley (1971) included medically remediable impairments (e.g., epilepsy) in their taxonomy but emphasized that these conditions do not require special education services. Griffing (1981), likewise, defined deaf children as those having "additional handicapping conditions that are corrected, ameliorated, or which otherwise do not impede receiving instruction in the conventional curriculum and educational setting" (p. 5). In either case, labeling children as MHHI for educational purposes does not seem to have any value or benefit for them.

Griffing (1981) also identified a subgroup "whose basic needs are for medical care on a 24-hour basis" (p. 6). This group and the other group he identified as needing care in a personal care facility are probably synonymous with Lennan's group requiring continual custodial care. While a large proportion of MHHI students are hospitalized in institutions for the mentally retarded (Brannan et al., 1975) that may operate according to a medical model, it is questionable whether a significant number of them actually are sick and require continuing medical care (Wolfensberger, 1976). Similarly, the concept that significant numbers of MHHI children are more appropriately placed in personal care or custodial care facilities is questionable. Current legislation, litigation, and a growing body of research have established that even the lowest functioning students can benefit from educational programs (Sontag, Certo, & Button, 1979). A taxonomy for MHHI students that categorizes those who receive total medical, personal, or custodial care can only result in excluding them from beneficial special education services. Inclusion of such a category is not supportable.

Moores (1982) postulated that a major category of MHHI students is the group whose handicaps are caused not by a disability but by inappropriate educational experiences. This group may be similar to Bond's (1979) group, whose difficulties were due to exogenous factors such as late diagnosis or problems in the home. In these cases, the accompanying handicaps are artificial. The value of labeling these students as MHHI must be questioned, especially if the label serves to limit service options for the students and reinforces inappropriate educational methodology. If the cause of the problem is the educational environment and not the students themselves, it would seem to make more sense to improve the environment and prevent the creation of artificial MHHI students. Using an inappropriate educational history as a basis for classification as MHHI appears to have the same fallacies as

"Educational significance [of a disability] should be understood in terms of special education need . . . rather than medical diagnosis. . . ."

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using failure in an established program as a basis for determining the educational significance of additional disabilities.

As with determination of educational significance of additional handicaps, a valid taxonomy for MHHI students must consider educational need. The identification of placements where the students will benefit most is a step in that direction (Lennan, 1974). Griffing (1981) went a step further and identified three subgroups of MHHI students based on need for modifications in instructional objectives, environment, rate, methodology, or staff. The distinction between the "educationally remediable" and "educationally adjustable" subgroup of Power and Quigley (1971) is similar. The additional handicaps of the former group can be removed by special education, therapy, etc., but the latter group requires an adaptation of the program to accommodate their disabilities.

Summary

MHHI students are a very heterogeneous group with widely varying needs and characteristics. This has caused difficulty in defining, identifying, and serving them and has led to efforts to subdivide them for educational purposes. Identification of students as MHHI should be accomplished only in the context of a continuum of programs available to meet their unique needs. Students identified as MHHI should be those who have educationally significant handicaps in addition to hearing impairment. Professionals in the MHHI area should have a clear understanding of the effects of these handicaps. Educational significance should be understood in terms of special educational need parameters, such as unusual instructional objectives, environment, rate, methodology, and staff, rather than medical diagnosis, categories of handicaps, or failure in an established program. Special educational need parameters also can provide a basis for classification of MHHI students where classification will result in improved educational decision making. Finally, professionals concerned with MHHI students should not fail to take advantage of the resources available from related service networks, including those concerned with severely handicapped, deaf-blind, and developmentally disabled students.

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Psychological Evaluation of Multihandicapped Deaf and Hard-of-Hearing Youth

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The literature clearly shows that the psychological evaluation of multihandicapped deaf or hard-of-hearing children presents a uniquely difficult challenge for all psychologists, even those trained to work with this special population. The danger of gross misdiagnosis is greater with this population than with any other disability group (Levine, 1971; Sullivan & Vernon, 1979; Zieziula, 1982).

In any discussion of techniques or strategies in the assessment of deaf and hard-of-hearing multihandicapped youth, the first consideration should be how and why psychological evaluation is useful to the child and to his/her education or psychotherapeutic program. The five major reasons are:

1. to determine program placement,
2. to predict future performance,
3. to diagnose (including specific descriptions of behaviors that document diagnostic impressions),
4. to aid in planning future treatment, rehabilitation, and/or education, and
5. to assess change over time.

Valid psychodiagnostic data combined with other relevant material should accurately portray a child's assets, liabilities, and individual needs. Operationally stated recommendations for appropriate services, suggestions on how to handle specific problems, and directions on how assessment material may be utilized in the development of an educational or treatment program are what teachers and rehabilitation specialists want and need. An evaluation which only offers an IQ score or a diagnostic label is incomplete and relatively useless.

When conducting a complete assessment, the psychologist should attempt to collect as much of the following data as is possible. The age of the deaf youth will affect how the data is obtained—either as part of the evaluation itself or from dependable available records (Sullivan & Vernon, 1979; Vernon, 1980).

1. Case history data including data on the hearing loss, degree of loss, age at onset, etiology (if available), and past educational history.
2. Previous medical and audiological evaluations.
3. A measure of intelligence.
4. A measure of educational achievement (from reliable records or the evaluation).
5. An appraisal of communication and language skills, including the child's preferred mode(s) of communication.
6. An evaluation of personality structure including social, emotional, and behavioral status.
7. Aptitude and interest testing.
8. A neuropsychological assessment including the identification of cognitive styles, memory, and processing skills.
9. An appraisal of the child's work habits in the test situation including readiness skills (e.g., attention to task, attention to examiner, motivation and interest, response to reinforcement).
10. Identification and description of additional handicapping conditions.

Some of the data can be obtained from school records or interdisciplinary staffings and parent/teacher conferences. Also, observations of the child in a variety of situations outside of testing, such as in the home, school, or dormitory (noting style of interaction, play skills, self-help skills, etc.) can provide valuable information for the formulations of clinical impressions and for meaningful recommendations.

Before further discussion, two definitions may be helpful. The term *deaf,* defined for purposes of this paper, refers to individuals born without sufficient hearing to understand speech, or to those people who lost their hearing before learning language (i.e., at or before reaching three years of age). *Hard-of-hearing* refers to individuals born with impaired hearing who can understand a significant percent of what is said under quiet one-to-one conditions, but who miss parts of conversation even under these ideal conditions. In the presence of background noises or in groups, they are able to grasp little or nothing of what is said.

Demographic studies over the past decade estimate that approximately 20–40% of school-age deaf children are categorized as multihandicapped (Jensema & Mullins, 1974). This is because many of the leading etiologies of profound hearing loss in children (i.e., prenatal rubella, premature birth, complications of Rh factor, and meningitis) are also major causes of mental retardation, visual defects, orthopedic problems, cerebral palsy, aphasia, and other physical and learning difficulties (Vernon, 1969). This article will describe procedures and materials that can be used in the psychological evaluation of these multihandicapped deaf and hard-of-hearing children. Previous research and clinical experience form the basis for these descriptions.

Very little solid research has been done on psychological testing with deaf youth. Testing procedures have not been standardized for many tests and there are few psychological tests specifically designed for deaf children. The problem is compounded because of the lack of psychologists experienced and qualified to work with this population. In fact, many persons currently offering psychological services, including psychological assessment, have limited experience and training with hearing-impaired populations and inadequate communication abilities, especially in American Sign Language. A study of psychological service providers in the

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New York and New England area (McQuaid & Alovisetti, 1981) found that only 34% of the providers polled had training in the education of hearing-impaired children, 32% cited training in diagnostic techniques appropriate to the deaf population, and 66% reported some training in communication with the hearing impaired. In the same study, 63% of those polled held state certification as school psychologists.

Another major study of psychological service providers to hearing-impaired students (Spragins, Karchmer, & Schildroth, 1981) showed that only 15% of the 808 respondents (627 part-time and 168 full-time) reported hearing impairment as a focus in their degree program. Inservice or on-the-job training was the basis for their acquisition of knowledge on the psychology of deafness. Also, nearly 30% of the total group rated their manual communication skills as "average or above." Only 33% of the group even used sign language.

The tragic misdiagnoses and inadequate evaluations that have resulted from these limitations have been described (Sullivan & Vernon, 1979; Vernon, 1980; Vernon & Brown, 1964). Such errors are still commonplace. Therefore, even as the testing of deaf and hard-of-hearing children presents a difficult challenge for the trained psychologist, the evaluation of the multihandicapped hearing-impaired child is an even more complex psychodiagnostic task.

General Principles for the Evaluation of Deaf Children

Certain basic considerations are essential if valid results are to be expected. First, there are several factors and test conditions which may result in the hearing-impaired child performing at a level well below his or her potential. Among these are impulsive response patterns, poor attending behaviors, and a general lack of understanding of required tasks (sometimes due to poor communication between the examiner and the child). The psychologist's lack of awareness about deafness may result in the use of inappropriate tests, e.g., verbal instruments that actually reflect the child's disability or limitations in English and in no way measure the child's intelligence, aptitudes, or psychological adjustment. For these reasons, there is an ever-present danger that the psychologist's measures of the child are an invalid underestimate (Vernon, 1976). It is important, therefore, that specific guidelines for selection of tests and testing procedures be followed. These guidelines are as follows:

1. Psychological tests that involve the use of verbal language to measure intelligence, personality, aptitude, or other attributes are not generally valid as they inevitably measure the hearing-impaired child's language limitations imposed by his/her deafness rather than his/her intelligence, aptitudes, or psychodynamics (Vernon, 1980). Also, multiple measures and comparisons of the child's abilities rather than one measure or estimate are suggested (Vernon & Brown, 1964).
2. Tests given by persons not experienced or familiar with deaf children are subject to appreciably greater error than those administered by trained examiners (Vernon & Brown, 1964). The selection of the psychologist to assess hearing-impaired students, especially those who are multihandicapped, is critical. Unfortunately, at the present time there is no certification process for psychologists trained to work with deaf children, nor is there a list of licensed examiners available to aid in the selection. If a qualified person cannot be found in the school or the school district, it is suggested that the state residential school for the deaf or the state specialist in deafness in the division of vocational rehabilitation be contacted. A directory of mental health programs for hearing-impaired persons is also available (Trybus & Edelstein, 1981). In some situations, sign language interpreters have been used by the inexperienced psychologist during testing. In our opinion, results reported when an interpreter is involved in testing are not likely to meet appropriate standards of validity (Vernon, 1976).
3. Group testing with deaf or hard-of-hearing children may be useful as a gross screening device but is, at best, a highly questionable procedure for measuring an individual's skills or capabilities (Vernon, 1980).
4. Although hard-of-hearing children may give the impression of understanding verbally presented test material, for diagnostic purposes these children should be given tests appropriate for deaf children and tests used for children with normal hearing. In many cases, large differences will appear in a comparison of sets of test responses; some children will score better on the test appropriate for deaf children. These findings should be considered as the more valid in this circumstance.
5. Testing and test scores with preschool and primary-age deaf children tend to be extremely unreliable. Low scores in particular should be viewed as questionable without other supporting data.
6. Thorough and valid evaluation of deaf children often requires much more time than is needed with

> "There are only a handful of psychologists competent to work with and evaluate deaf-blind children."

hearing children (Vernon, 1976). The examiner may choose to see the child after introductory tasks or over several sessions to ensure valid testing. Also, tests that emphasize untimed or *power* responses are often more valid than tasks that require timed responses.

7. A critical factor in accurate psychological evaluation is communication. The examiner must be able to communicate test instructions or expectations to the child. The psychologist should be prepared to present test materials to the child in the *child's* preferred mode of communication, which may include total communication, sign language, fingerspelling, speech, speechreading, braille, and/or gestures. To fail to be capable of doing this and to proceed with testing anyway is a serious breach of ethics, unless the situation offers no alternative. Then the results must be stated as tenuous at best.

Psychological Evaluation of Deaf-Blind Children

Perhaps more than any group of multihandicapped hearing-impaired children, the psychological evaluation of deaf-blind children is the most difficult. Major reasons for this are (a) the extreme difficulty of communicating with most deaf-blind children, (b) the limited number of psychological tests designed specifically for these children, and (c) the lack of psychologists qualified to work with them (Vernon & Green, 1980).

The problem of communication is determined, to a major extent, by the severity, age at onset, and cause of the visual and hearing impairments. These often are not clearly assessed, a fact which compounds the problem. Congenitally blind children who are adventitiously deafened by disorders such as meningitis or other postlingual viral infections may know braille, may speak intelligibly, and/or may use written language. Congenitally deaf children who become blind after learning manual communication systems may continue to depend on sign language (tactily received) after the onset of blindness. These children will generally not be able to speak intelligibly and may have severely limited reading and writing skills despite normal performance IQs. Another group includes those children who became deaf and blind later in life. They rarely know braille or sign language well (Vernon & Green, 1980). Another observed deterrent to effective communication may be the interference of behaviors associated with this disability. Behaviors such as self-stimulation, self-abuse, perseveration and/or withdrawal greatly impede evaluation.

Once etiology, age at onset of the disabilities, and communication modalities are determined, it is possible to select a psychologist and appropriate psychological tests for evaluation. Most often, testing is easier with deaf-blind children who lost their hearing later in life. These children may have normal language patterns and braille skills. The psychologist may be able to administer verbal IQ, personality, interest, and aptitude tests in braille (Vernon & Green, 1980). Obviously this assumes that the psychologist is familiar with blind children and comfortable using and reading braille (Bauman, 1975).

Psychologists who test prelinqually deafened children whose primary means of communication is sign language should be trained in sign language. Some performance tests may be used if the child possesses enough residual vision (Vernon & Green, 1980).

To reiterate an earlier point, almost no psychological tests have been developed for this population and there are only a handful of psychologists competent to work with and evaluate deaf-blind children. One instrument has been designed especially for deaf-blind children—the Callier-Azusa Scale (Stillman, 1975). The scale has norms for ages zero to 9 years and may be used with low-functioning deaf-blind youth. Areas of evaluation include

1. motor development—postural control, locomotion, fine motor control, visual motor control;
2. perceptual abilities—visual development, auditory development, tactile development;
3. daily living skills—undressing and dressing, personal hygiene, feeding skills, toileting;
4. cognition, communication, and language—cognitive development, receptive language, expressive language, speech; and
5. socialization—development of self-control.

The Callier-Azusa serves as a resource in the development of the child's individualized education program. Data is collected through observation, interaction with the child, and interviews with persons (i.e., parents, teachers) who have been involved with the child for extended periods of time. Teachers and other professional school personnel (instead of a psychologist) often give the Callier-Azusa. The scale is based on normative developmental data for deaf-blind children (Stillman, 1975). Information collected in testing yields scores which are compared to age equivalent norms. The table for conversion to age equivalents is controversial and many professionals choose not to use it (Vernon, Bair, & Lotz, 1979).

Other developmental scales have been adapted for use with deaf-blind children. However, most of these have been normed on other populations. One, the Learning Accomplishment

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Profile (LAP), was developed for handicapped children ages 6 months to 5½ years (Sanford, 1974). The LAP measures six major areas—gross motor, fine motor, social, self-help, cognitive, and language. It is intended to provide the teacher or parent with a complete profile of the child's developmental abilities. A task-level hierarchy with 44 weeks of related curriculum units is included to aid the teacher in making lesson plans and further assessment. Some LAP test items and evaluation areas are appropriate for use with deaf-blind children and others are not (Vernon, Bair, & Lotz, 1979). Another scale which has been used recently is the Behavior Rating Instrument for Autistic and Other Atypical Children (Kates, Schein, & Wolf, 1981; Ruttenberg, Kalish, Wenar, & Wolf, 1976). It measures eight areas—relationship to an adult, communication, sound and speech reception, vocalization and expressive speech, drive for mastery, social responsiveness, body movement, and psychobiological development.

No psychodiagnostic instruments have been developed specifically for deaf-blind children that assess areas such as personality, interests, aptitudes, or academic level (Vernon, Bair, & Lotz, 1979).

Psychological Evaluation of Deaf Cerebral Palsied Children

There is a higher prevalence of deafness among cerebral palsied children than in the general population (Gerber, 1966; Nakono, 1966; Vernon, 1970). In addition, the primary etiologies of hearing impairment are also major causes of cerebral palsy, e.g., Rh incompatibility, birth trauma, prematurity, and complications during pregnancy. Neurologic impairments which may influence the information-processing system, visual problems, and mental retardation also are seen frequently in conjunction with cerebral palsy (Kirk & Gallagher, 1979; Vernon, 1970). Statistics from personal clinical experience indicate that almost 50% of the hearing-impaired cerebral palsied school children evaluated have average or better intelligence, and approximately 20% are mentally retarded. Unfortunately, misdiagnosis has been a frequent occurrence for these children. Their failures on psychological tests, often due to their physical disability, have been mistakenly interpreted as indications of mental deficiency. For example, these children are often slow to respond on timed tasks. As is the case with deaf-blind children, care should be taken that a psychodiagnosis not be accepted unless it is confirmed by a trained psychologist with extensive knowledge of deafness and cerebral palsy. When psychological diagnosis is significantly different from the judgment of experienced teachers or other professionals working with a particular child, other evaluation and observation should be undertaken (Vernon, 1970).

There are several factors which deserve special consideration in the evaluation of deaf cerebral palsied children, notably communication. These children may be able to receive presented material visually and/or auditorily (depending on their residual hearing). They may understand instructions presented in sign language or gesture. However, due to severe motor disabilities, they may be unable to respond through speech, understandable manual communication, writing, or the manipulation of presented materials. Deaf cerebral palsied children usually respond best in the readily visible language of signs. Signing involves less motoric control than the movements required for speech (Vernon, 1970). Recommendations for testing include avoiding timed tasks, working in short test sessions to reduce fatigue, and using familiar surroundings to minimize increases in motor disturbance.

Two tests of intelligence that have been used successfully are the Leiter International Performance Scale (Leiter, 1969) and the Raven's Progressive Matrices (Raven, 1948). Both are performance scales and both minimize or eliminate timed responses. Depending on the severity of the motor problem, the child may respond by manipulating the test parts, by pointing to them, or by making appropriate movements (e.g., nodding approval/disapproval for examiner's responses). The Raven's Progressive Matrices are often used as a second measure to support other more comprehensive intelligence tests. The Raven's (The Coloured Progressive Matrices and the Standard Progressive Matrices) are not useful with children who respond impulsively or who are distractible (Sullivan & Vernon, 1979). Again, depending on the severity of the child's motor difficulties, various other scales (or parts of them) may be useful. Subtests of the Hiskey Nebraska Test of Learning Aptitude (Hiskey, 1966), including Memory for Color, Picture Identification, Picture Association, and Visual Attention Span, fall into this category.

Scales of visual-perceptual abilities may be administered in modified form. Among them are the Motor-Free Visual Perception Test (Colarusso & Hammill, 1972), the Spatial Orientation Memory Test (Wepman & Turaids, 1971), the Visual Discrimination Test (Wepman, Morency, & Seidl, 1975a), and the Visual Memory Test (Wepman, Morency, & Seidl, 1975b).

Also, adaptive behavior scales, including the LAP (Sanford, 1974) and others, may be used to obtain additional information on the child's levels of functioning in various specific skill areas. Again, instruments or

"If considerable subtest variability is present... clear statements should be made that valid IQ results were not possible."

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sections of instruments which emphasize competency in auditory, verbal, linguistic, and/or physical-motor skills should be avoided.

Few psychodiagnostic scales that assess personality or social-emotional growth are appropriate with deaf cerebral palsied youth. Interaction with the child and observation of his/her behavior in various settings, such as during individual and group play, must be substituted.

Psychological Evaluation of Mentally Ill Deaf Children

When serious psychological disturbance is present, especially psychosis, it is often difficult or impossible to measure IQ and other variables such as interest or aptitude. The major danger is that the presence of mental illness will impair cognitive function to the point that mental retardation is incorrectly diagnosed. Ultimately, the only assurance that such an error will be avoided is the clinical judgment of a competent diagnostician.

When there is wide subtest variability and a low overall IQ in the presence of suspected emotional disturbance, the diagnosis of mental retardation often is incorrect. This is seen sometimes in autistic deaf children who may get perfect scores on the Block Design Subtest of the Wechsler Intelligence Scale for Children-Revised (1974) but obtain scaled scores on other subtests of zero.

By giving a sufficient number and variety of tests and subtests to adequately sample behavior, a psychologist can minimize the danger of misdiagnosis. If considerable subtest variability is present or there are other reasons to doubt the validity of the IQ, clear statements should be made that valid IQ results were not possible. In such cases no IQ score should be reported. An estimation in terms of some broad IQ range can be made, if properly qualified.

Projective screening devices such as the Bender-Gestalt or the Draw-A-Person Projective Technique may be used with deaf emotionally disturbed youth, but they alone do not provide adequate data for a diagnosis. Paper and pencil tests such as the Edwards Personal Preference Schedule or the Minnesota Multiphasic Personality Inventory (MMPI) require a level of English competence far above that possessed by most deaf youth. Thus, their administration tends to result in random responses that yield invalid results. Projectives such as the Rorschach Test or the Thematic Apperception Test (TAT) require that the psychologist and deaf youth be fluent in American Sign Language. Efforts to use writing are usually unsuccessful because of the aforementioned limited English competence of most deaf youth. Written responses tend to be constricted, just as they would be if a hearing person tried to take a Rorschach in an unfamiliar foreign language. Such responses have no relationship to personality structure, yet deaf people often are incorrectly diagnosed as having a "constricted personality" on the basis of written Rorschachs and TATs which in reality only reflect their paucity of English. Because of the lack of adequate personality tests and the shortage of psychologists skilled in sign language, the diagnoses of mental status often have to be made based on extensive case history data, behavioral observation, and informant interviews.

One final caution. The incorrect English syntax and limited vocabulary of most deaf youth can result in written language patterns suggestive of schizophrenia or other psychotic disorders. Only when both parties can converse comfortably in the same language (i.e., American Sign Language) can it be determined with certainty whether or not a thought disorder is present.

Psychological Evaluation of Deaf Mentally Retarded Children

A diagnosis of mental retardation should be based on both the child's level of intellectual functioning (usually an IQ) and his/her levels of adaptive behavior (Grossman, 1973). When the diagnostic issue is possible mental retardation, it is important to remember that there is far more danger that a low IQ rather than a high IQ, is invalid (Vernon, 1976). The misdiagnosis of mental retardation and the resulting inappropriate placement of deaf children is a common but tragic occurrence. The recent emphasis on adaptive behavior by the American Association of Mental Deficiency helps to prevent this, but only if appropriate norms for deaf children are familiar to the diagnostician. An evaluation that considers both IQ and adaptive behavior provides not only a more comprehensive description of the child but better insight into individual program needs. Many of the considerations in testing deaf-blind and deaf cerebral palsied children apply to deaf mentally retarded youth, i.e., extensive case history information, observation and interaction with the child in various settings, avoidance of timed tasks and lengthening test sessions, and awareness of the child's preferred mode of communication to be certain that the child fully understands test directions. Several additional tests are available for evaluation of deaf and deaf mentally retarded children, including the Wechsler Intelligence Scale for Children-Revised (WISC-R) Performance Scale, the Hiskey-

> "It is best to start test administration well below the child's chronological age range."

Nebraska Test of Learning Aptitude, the Leiter International Performance Scale, and the Raven's Progressive Matrices (Sullivan & Vernon, 1979). The WISC-R Performance Scale has been standardized with a hearing-impaired sample, and norms are available for children with chronological ages 6 to 16 years (Anderson & Sisco, 1977). Norms and directions for test administration are available for hearing-impaired children on the Hiskey-Nebraska Test. The Hiskey may be used with children 3 to 17 years of age. Some other scales for preschool-age children are the Developmental Activities Screening Inventory (DASI), the Bayley Scales of Infant Development, and the Merrill-Palmer Scale of Mental Tests. The DASI (DuBose & Langley, 1977) may be a useful screening measure of cognitive development for children 6 months to 5 years of age (Sullivan & Vernon, 1979). The Bayley Scales provide information on developmental status and are standardized for hearing children ages 2 months to 30 months (Bayley, 1969). Items which emphasize auditory or linguistic skills should be avoided. The Merrill-Palmer Scale includes 19 subtests of nonverbal abilities and is used with children in preschool and primary grades (Stutsman, 1931). With all of these scales, the examiner should have knowledge of the psychology of deafness and should be thoroughly comfortable with the instrument.

Selecting Appropriate Assessment Tests

Few adaptive behavior scales are available to the psychologist working with deaf children. All of the existing ones, with the exception of the Meadow/Kendall Social-Emotional Assessment Inventory for Deaf Students (Meadow, 1980), have been normed with hearing-impaired samples. The Meadow/Kendall Inventory measures social adjustment, self-image, and emotional adjustment and provides norms for ages 7 to 21 years. The AAMD Adaptive Behavior Scale for Children and Adults (Fogelman, 1975), the Learning Accomplishment Profile (Sanford, 1974), and the Camelot Behavioral Checklist (Foster, 1974), if adapted, may provide helpful information.

For neuropsychological assessment, the Developmental Test of Visual-Motor Integration (Beery & Buktenica, 1967) and the Visual Retention Test (Benton, Hamsher, & Stone, 1977) are useful. Because selection is an important concern, a psychologist should use and compare several scales rather than accept the data obtained on one test. It is best to start test administration well below the child's chronological age range. When possible, practice or sample items should be included to provide the child with some early success and to assure that the directions are understood. Involving a person familiar to the child (teacher, counselor, or parent) can sometimes make it possible to validly assess a child otherwise untestable. For example, a teacher may be aware of strategies or techniques used to elicit certain desired responses and behaviors and will know if test behavior during evaluation is representative of the child's capabilities.

Summary

It has been the purpose of this article to provide psychologists, educators, audiologists, and speech therapists with a useful reference for tests and procedures found helpful for the psychological evaluation of deaf and hard-of-hearing multihandicapped children.

Basic psychological tests of intelligence, personality, and brain damage have been evaluated and fundamental considerations regarding their use with multihandicapped deaf and hard-of-hearing children have been discussed. Recommended tests for different age ranges of preschool and school-age children are given.

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Developing Awareness and Acceptance of Multihandicapped Hearing-Impaired Students

Edgar H. Shroyer

A considerable amount of literature delineates the importance of nonhandicapped students developing awareness and acceptance of handicapped students in regular education classrooms (Gottlieb, 1975; Handlers & Austin, 1980; Levitt & Cohen, 1976). Yet, very little exists on handicapped students developing acceptance of multihandicapped hearing-impaired students (MHHI) or students with other primary handicapping conditions. The lack of studies may indicate that researchers assume students who have one handicap, hearing loss, have a natural and reciprocal acceptance of students with that same, plus additional handicaps. However, personal experience with hearing-impaired students has indicated otherwise. Hearing-impaired students in residential schools for the deaf that have programs or classes for MHHI students are very much aware of their presence. This awareness has resulted in either rejection of, acceptance of, or indifference to the MHHI students. Schools should assist hearing-impaired students in (a) developing awareness of the problems additional handicapping conditions impose on students, (b) accepting MHHI students as equals, (c) involving MHHI students in activities, and (d) helping MHHI students cope with their multiple handicaps.

Public Law 94-142 has provided educational opportunity for all hearing-impaired students and has encouraged integration, where appropriate, with hearing peers. Although the law ensures educational opportunities for MHHI students, these students generally have not been integrated with their hearing or hearing-impaired peers. Instead, they have been placed in special classes, either in schools for exceptional (handicapped) children or residential schools for the deaf, a situation which often succeeds in isolating them and, thereby, fostering misunderstanding, indifference, or rejection.

Educators of exceptional students are aware of the existence of a pecking order in their schools. Students quickly become aware of class placements and other students' abilities. Consequently, students with the least academic ability frequently bear the brunt of peer rejection and misunderstanding—unless, perhaps, they excel in other areas, such as athletics. Unfortunately, MHHI students rarely can compete successfully in other areas. Their inability to communicate easily with other students further encourages their rejection.

In many cases, schools unwittingly foster and perpetuate the stigma placed on MHHI students. Classes or programs for MHHI students are generally segregated in a remote area of the campus or school building. Basements seem to be a popular place. This isolation enhances the "unique" or "mysterious nature" negatively attributed to MHHI students. It is not uncommon to see hearing-impaired students teasing one another about being sent to the MHHI classes. This teasing is often a direct result of remarks made by teachers, who, in unthinking moments, state, "Behave or I will send you to the MHHI class," or "If you don't know the answer, maybe you should go to the MHHI class." This is an unfortunate and intolerable situation which must be remediated through a process of inservice education for teachers, especially because more and more MHHI students are being identified and placed in educational programs. If they are not accepted and given an opportunity to develop confidence and self-esteem within school programs, what do they have to look forward to after leaving school?

The focus of this paper is on presenting resources and a typical approach used to develop positive attitudes toward all handicapped and MHHI students.

Previous Research

It is reported that by the age of four or five children begin to discriminate against physically handicapped individuals (Jones & Sisk, 1970). Consequently, awareness and acceptance education should start early with emphasis on the abilities, rather than the disabilities, of handicapped students. Carmino Ravosa, a songwriter for the Captain Kangaroo television program, has written two songs depicting handicapped individuals in a very positive way. Since the target population of this program is preschoolers, the airing of these songs, "Put on a Handicap" and "A Handicap Is Often Very Handy," may provide an excellent means of ingraining positive attitudes and acceptance of handicapped individuals in young children.

Most of the literature on developing awareness and acceptance of handicapped students by nonhandicapped students emphasizes interaction. McHale and Simeonsson (1980) provided play periods of 30 minutes over a five-day period for mentally retarded autistic, and nonhandicapped children 7 to 10 years of age. The play periods were unstructured. The nonhandicapped children were told that the mentally retarded autistic children did "not know how to play." "It is your 'job' to teach them." The researchers found that understanding of autism was positively related to the frequency of the nonhandicapped children's communication with the mentally retarded au-

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The author wishes to thank C. Byrd and J. Wright for sharing information about the awareness program they developed for the Winston-Salem School District.

"Interaction between MHHI students and other students should be fostered."

tistic children. In addition, the authors found a negative correlation between the children's positive attitudes toward autism and their frequency of solitary play.

Smith and Larson (1980) found that students in integrated classrooms had significantly more positive attitudes toward physically handicapped students than did students in segregated classrooms. Segregation of MHHI students in academic situations is often based on educational necessity. Other arrangements are sometimes possible if the overall best interests of the child are kept in mind. Nonacademic situations such as physical education, recess, art classes, and extracurricular activities do not always require the segregation of MHHI students. The opportunities for integration should be developed, and interaction between MHHI students and other students should be fostered. However, this is only the first step; non-multihandicapped students should understand the special programming needs of their MHHI peers.

Hagino (1980), a teacher of deaf-blind children in a public school, invited other classes to visit her classroom. She showed slides depicting everyday activities of her deaf-blind children, along with special procedures such as putting on leg braces and hearing aids, and sign and speech training. The nonhandicapped children learned a few signs, listened to amplified speech, and walked blindfolded. In addition, the children trailed (walked by holding onto a leader's arm) and tried eating a bowl of jello with a spoon while blindfolded. Hagino reported that all these activities, in addition to question and answer sessions, resulted in several positive behavioral changes. Students were observed playing with the deaf-blind children on the playground, sitting and talking with them, and greeting them in passing. One of the boys who participated in the activities wrote a thank-you note which probably reflected the feelings of many of the other students: "Thank you for inviting us to your class. I was scared when I came in, but I am not scared now."

Simulation activities as a means for changing attitudes were also emphasized by Jones, Sowell, Jones, and Butler (1981). They suggested such activities as wearing earplugs and blindfolds, using wheelchairs, and doing daily chores using only one hand or one leg.

Older students can be referred to books written specifically about handicapped individuals. Trade books, rather than basal readers, are suggested for several reasons. Hopkins (1979) found that less than 1% of basal reader selections in grades one through six made any reference to handicapped individuals. Trade books (see Suggested Resources) can be found that encourage positive attitudes towards handicapped individuals, allow students to identify with certain handicaps, and provide insight for the brother or sister of a handicapped individual (Hopkins, 1980).

A Typical Program

A program set up by Byrd and Wright (1981) appears to be typical of most programs that develop awareness and acceptance of handicapped students. The public school where the program was initiated served 38 students identified as having special needs, 11 hearing-impaired students, and 430 nondisabled students. Byrd was a teacher of a class for hearing-impaired students and Wright was the school counselor. Considerable mainstreaming of the handicapped students into classes with the school's nonhandicapped population prompted the authors to begin the program. The unique aspect of the program was the involvement of the handicapped students. They were given the same opportunity as the nonhandicapped students to learn about their own, as well as other, handicaps. The short-range goals of this program were as follows:

1. To increase students' awareness of different handicaps and programs for exceptional children.
2. To give students an opportunity to express fears and ask questions concerning handicaps.
3. To dispel incorrect ideas concerning handicapped people.
4. To show that handicapped people have feelings, too.
5. To provide an opportunity for regular students to experience the frustration of having a disability through simulation.
6. To look at likenesses and differences among students.
7. To provide an understanding of other handicaps to handicapped students.

The long-range goals were:

1. To change nonhandicapped students' attitudes toward handicapped students.
2. To foster better relations between handicapped and nonhandicapped students.
3. To relieve stress that mainstreamed handicapped students might encounter.

The program extended over five weeks and coincided with the school's guidance program, directed by Wright. Only third and fourth grade students ($N=119$), along with the 38 special needs students, participated. Cooperation of the teachers was obtained by offering them optional planning periods during the time the students were participating in the program. (A residential school for the deaf with an MHHI population would afford easy coordination and effective

> "Acceptance must be instilled in children at a very young age."

execution of this type of program. Both staff and students in residential programs should be involved.)

The most common instruments used for determining attitudes toward handicapped individuals are teacher-made questionnaires (Jones et al., 1981; Rapier, Adelson, Carey, & Kroke, 1972). Extensive use has been made of the "Attitude Toward Disabled Persons" scale developed by Yuker, Block, and Young (1966). Byrd and Wright (1981) used their own questionnaire. This was administered during the first week to all participating students. Prior to administering the survey, the following terms were defined for the students.

deaf: lacking the ability to hear, either completely or partially

disability: not having or losing a mental or physical capacity; a medical diagnosis

disabled: weakened or destroyed normal capacities or abilities

contagious: capable of being transmitted by direct or indirect contact; spreads easily from one person to another

retarded: abnormally slow in mental or emotional development

pity: a feeling of sorrow for another's suffering

handicap: any problem in the functioning of the body or mind that prevents someone from living normally; what a disability prevents someone from doing

The six special classes in the school were briefly discussed after the definitions were given. These classes were for children with hearing impairments, emotional handicaps, mental handicaps, learning disabilities, physical handicaps, and cerebral palsy.

Next, the questionnaires were administered and the students were urged to answer each question honestly. After the questionnaires were completed, the format for the next few weeks was presented, followed by a question and answer session.

During the second week, two classes at a time watched the *Feeling Free* video cassettes. Two cassettes were shown (each 30-minutes long) and were followed by a brief discussion emphasizing feelings, likenesses, and differences. A total of six cassettes was shown.

The third week was devoted to simulation activities found in *Feeling Free Activities and Stories* (Benham, 1978). Some activities were required; some were optional. They were conducted by the regular classroom teachers and consisted of activities such as tying one's shoes with only one hand, buttoning an oversized shirt with socks on one's hands, locating objects in the building while blindfolded, and identifying objects in a box by touch only. After each activity a discussion was held to allow students to express how they felt during the activities and to project what these feelings imply in the daily life experiences of handicapped students. Also, during the third week, an optional poster contest was held using the theme, "Sticks and Stones May Break My Bones, But Names Will Really Hurt Me" (Benham, 1978).

During the fourth week, the questionnaires were administered again, followed by a discussion during which students voted on the best possible answers and explained their choices. At a popcorn party, the poster contest winners were announced. Three winners were picked from each classroom. During the fifth week the winning posters were displayed in the lobby outside the principal's office for the benefit of the entire school.

Although Byrd and Wright (1981) did not do a statistical analysis on the pre- and post-questionnaire attitudes, the raw data were reported. They reported that the pre-questionnaire results indicated that most students knew very little about, or were not sure about, handicapping conditions. This also was true for the handicapped students. After the program, the post-questionnaire responses appeared to indicate a better understanding of handicapping conditions. Jones et al. (1981) followed a similar program of simulation, showing slides and videotapes. They reported that post-test scores on their questionnaire demonstrated significant positive changes in students' perceptions of handicapped people.

Although most programs for developing acceptance of handicapped individuals are created and designed by teachers for their own classes, some packaged programs are available. Meeting Street School in Rhode Island developed a 16-hour curriculum to cover blindness, deafness, mental retardation, and physical handicaps. It includes simulation activities, work with aids and appliances, discussions, visits with handicapped adults, printed materials, and other media. The program is based on the book, *Please Know Me as I Am,* by Margaret Cleary.

Summary

In order to eliminate prejudice and misunderstanding of handicapped children, acceptance must be instilled in children at a very young age. This requires an organized, conscious effort on the part of all adults responsible for educating children. This acceptance has been documented in studies involving the attitudes of nonhandicapped students toward their handicapped peers. However, little is reported about handicapped students' acceptance of multihandicapped students. This acceptance is critical for the emotional development of both populations, particularly in light of the fact that the two generally are schooled together. Administrators and teachers in these schools should initiate, follow through with and follow-up on awareness programs to ensure an atmosphere of mutual acceptance and respect among hearing-impaired and multihandicapped hearing-impaired students.

Suggested Resources for Increasing Awareness of Handicapping Conditions

Feeling Free Series

Benham, H. (Ed.). *Feeling free activities and stories.* New York: Scholastic Book Services, 1978.

Benham, H. (Ed.). *Feeling free: Teaching guide for print materials.* New York: Scholastic Book Services, 1978.

Brightman, A.J., & Storey, K.S. (Eds.). *Ginny.* New York: Scholastic Book Services, 1978.

Brightman, A.J., & Storey, K.S. (Eds.). *Hollis.* New York: Scholastic Book Services, 1978.

Brightman, A.J., & Storey, K.S. (Eds.). *Laurie.* New York: Scholastic Book Services, 1978.

Ginny. New York: Scholastic Book Services, 1978. (Video cassette # SF510)

Gordon. New York: Scholastic Book Services, 1978. (Video cassette #SF513)

Growing Up. New York: Scholastic Book Services, 1978. (Video cassette #SF514)

Hollis. New York: Scholastic Book Services, 1978. (Video cassette #SF509)

Laurie. New York: Scholastic Book Services, 1978. (Video cassette #SF512)

Trade Books on Blindness

Fassler, J. *Howie helps himself.* Chicago: A. Whitman & Co., 1975.

Gill, T. *Tom Sullivan's adventures in darkness.* New York: McKay, 1976.

Litchfield, A. *A cane in her hand.* Chicago: A. Whitman & Co., 1977.

Little, J. *From Anna.* New York: Harper & Row, 1972.

Parker, M. *Horses, airplanes and frogs.* Elgin, Ill.: The Child's World, 1977.

Peterson, P. *Sally can't see.* New York: John Day Junior Books, 1974.

Wolf, B. *Connie's new eyes.* Philadelphia: J.B. Lippincott Co., 1976.

Wosemek, F. *A bowl full of sun.* Chicago: Children's Press, 1976.

Trade Books on Deafness

Arthur, C. *My sister's silent world.* Chicago: Children's Press, 1979.

Levine, E. *Lisa and her soundless world.* New York: Human Sciences Press, 1974.

Litchfield, A. *A button in her ear.* Chicago: A. Whitman & Co., 1976.

Peter, D. *Claire and Emma.* New York: John Day Junior Books, 1977.

Peterson, J. *I have a sister, my sister is deaf.* New York: Harper & Row, 1977.

Wolf, B. *Anna's silent world.* Philadelphia: J.B. Lippincott Co., 1977.

Trade Books on Physical Disabilities

Berger, G. *Physical disabilities.* New York: Franklin Watts, Inc., 1979.

Biklen, D., & Sokolaff, M. *What do you do when your wheelchair gets a flat tire?* New York: Scholastic Book Services, 1978.

Fanshawe, E. *Rachel.* Scarsdale, N.Y.: Bradbury Press, 1975.

Henriod, L. *Special Olympics and Paralympics.* New York: Franklin Watts, Inc., 1979.

Kamien, J. *What if you couldn't . . . ? A book about special needs.* New York: Charles Scribner's Sons, 1979.

Mack, N. *Tracy.* Chicago: Children's Press, 1976.

Pursell, B. *A look at physical handicaps.* Minneapolis: Lerner Publications, 1976.

Stein, S. *About handicaps.* New York: Walker, 1974.

Sullivan, M.B., Brightman, A., & Blatt, J. *Feeling free.* Reading, Mass.: Addison-Wesley, 1979.

White, P. *Janet at school.* New York: Thomas Y. Crowell, 1978.

Wolf, B. *Don't feel sorry for Paul.* Philadelphia: J.B. Lippincott Co., 1974.

Trade Books on Mental Retardation

Anders, R. *A look at mental retardation.* Minneapolis: Lerner Publications, 1976.

Baldwin, A. *A little time.* New York: Viking Press, 1978.

Brightman, A. *Like me.* Boston: Little, Brown & Co., 1976.

Byars, B. *The summer of the swans.* New York: Viking Press, 1970.

Christopher, M. *Long shot for Paul.* Boston: Little, Brown & Co., 1966.

Crane, C. *A girl like Tracy.* New York: McKay, 1966.

Dunbar, E. *Mental retardation (A first book).* New York: Franklin Watts, Inc., 1978.

Fassler, J. *One little girl.* New York: Human Sciences Press, 1969.

Friis-Baastad, B. *Don't take Teddy.* New York: Human Sciences Press, 1975.

Gold, P. *Please don't say hello.* New York: Human Sciences Press, 1975.

Hirsch, K. *My sister.* Minneapolis: Carolrhoda Books, 1977.

Klein, G. *The blue rose.* New York: Lawrence Hill & Co., 1974.

Larsen, H. *Don't forget Tom.* New York: Thomas Y. Crowell, 1974.

Ominsky, E. *Jon 0: A special boy.* New York: Prentice-Hall, 1977.

Parker, M. *He is your brother.* Nashville: Thomas Nelson, Inc., 1976.

Rodowsky, C. *What about me?* New York: Franklin Watts, Inc., 1976.

Shyer, M. *Welcome home, Jellybean.* New York: Charles Scribner's Sons, 1978.

Sobol, H. *My brother Steven is retarded.* New York: Macmillan, 1977.

Wrightson, P. *A racecourse for Andy.* New York: Harcourt Brace Jovanovich, 1968.

Trade Books on Learning Disabilities

Berger, G. *Learning disabilities and handicaps.* New York: Franklin Watts, Inc., 1978.

Lasker, J. *He's my brother.* Chicago: A. Whitman & Co., 1974.

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Hopkins, C.J. Developing positive attitudes toward the handicapped through children's books. *Elementary School Journal,* Summer 1980, pp. 34-39.

Jones, R., & Sisk, D. Early perceptions of orthopedic disability: A developmental study. *Rehabilitation Literature,* 1970, *31,* 34-38.

Jones, T. W., Sowell, V.M., Jones, J.K., & Butler, L.G. Changing children's perceptions of handicapped people. *Exceptional Children,* 1981, *47,* 365-368.

Levitt, E., & Cohen, S. Attitudes of children toward their handicapped peers. *Childhood Education,* 1976, *52,* 171-173.

McHale, S.M., & Simeonsson, R.J. Effects of interaction on non-handicapped children. *Journal of Mental Deficiencies,* 1980, *85,* 18-24.

Rapier, J., Adelson, R., Carey, R., & Kroke, K. Changes in children's attitudes towards the physically handicapped. *Exceptional Children,* 1972, *39,* 219-23.

Smith, D.B., & Larson, P.A. Adolescent attitudes toward disabled persons in an integrated and non-integrated school setting. *Education,* 1980, *100,* 390-394.

Yuker, H.E., Block, J.R., & Young, J. *The measurement of attitudes toward disabled persons.* Albertson, N.Y.: Human Resource Center, 1966.

Linking Classroom and Residence Hall: A Team Approach at the California School for the Deaf, Riverside

Mary Ann Salem
Larry Laputz

The population of multihandicapped deaf persons has increased sharply in the past twenty years (Schein & Delk, 1974). This primarily is due to (a) the rubella epidemic of 1963–65 and 1969, which presented to the world an entire subset of deaf persons with complications such as blindness, emotional disturbance, and severe learning problems; and (b) the rise in technological advances in medicine, which resulted in the continuation of life for many seriously impaired individuals who previously would not have survived.

In order to meet the needs of many of these children, the California School for the Deaf at Riverside (CSDR) established in 1969 a pilot program for the education of emotionally disturbed elementary-age deaf children (Lennan, 1973). Due to the program's success, it was expanded in 1972 to meet the needs of adolescent deaf students as well. Throughout its history, the goal of the Deaf Multihandicapped Unit (DMHU) has remained the same: to provide a program for those deaf children whose additional handicaps prevent them from participating in regular programs for deaf students.

The Academic Program

The DMHU serves 110 students ranging in age from 5 to 21. Most of the students have mental retardation as an additional handicap, followed closely by learning disabilities, orthopedic problems, and social/emotional problems.

The students are divided chronologically into two departments, DMHU-I and DMHU-II. Although these departments share most facilities and equipment, they function as separate school departments. Classes in DMHU-I and DMHU-II are self-contained. Each class has a team of 2 teachers and 8 to 10 students. The academic program in the Deaf Multi-Handicapped Unit emphasizes language, communication, math, prevocational, social, and self-help skills. Vocabulary, reading, speech, auditory training, and manual communication are also integral parts of the program.

Prevocational classes in the unit provide the students with an opportunity to participate in a broad spectrum of educational experiences. The prevocational program is, in fact, a focal point for the total academic program in Unit II. The unit's work experience coordinator places DMHU students into remunerative on- and off-campus work assignments ranging from restaurant work to surgical supply assembly. A number of these work assignments are made in conjunction with regional centers for the developmentally delayed and the Department of Vocational Rehabilitation. These placements, often the students' initial contact with social service agencies, are subject to continual evaluation.

In addition to academic course work students may participate in an adaptive physical education program that combines perceptual-motor skills, body and spatial awareness, and basic sport skills. Those who have orthopedic handicaps receive the services of occupational and physical therapists as well. This service is provided by California Children's Services, a state-funded agency that serves orthopedically handicapped children. This service is housed on the CSDR campus.

Behavior Management Program

Regardless of the unique learning needs presented by each student in the DMHU, a common anomaly shared by all is some kind of undesirable behavior, which, because of its severity, precludes the student's entrance into any of the regular school programs at CSDR. In order to address the behavioral needs of these children, a full-time psychoeducational consultant, in cooperation with both the education and dormitory personnel of the DMHU school, supervises and maintains a comprehensive behavior management program for each child. This program functions as a positive reinforcement system, and it attempts to support those behaviors that will most clearly aid students when they leave the sheltered environment of the Unit.

In an effort to provide the students with as much structured learning experience as possible, the school encourages cooperative programming between the classroom and dormitory. Classroom teachers and dormitory personnel jointly plan the educational objectives and lesson plans for each child. Either the classroom teachers or the dormitory staff may chair the program, i.e., assume the responsibility for follow-through documentation. For example, dormitory personnel have begun a program to teach students how to use public transportation. The dormitory staff determine the goals, write lesson plans, supervise field work, and write reports. In the classroom, the teaching faculty support and reinforce the program by adapting segments of the curriculum to support what is learned in the dormitory. The same situation occurs in reverse, as demonstrated by faculty-initiated programs dealing with time concepts. The classroom teachers, as part of the normal curriculum, handle lesson plans, objectives, etc., dealing with time; and the dormitory staff reinforce these concepts through experiential situations. Some additional examples of ongoing programs being shared by both the dormitory and the classroom staffs are money concepts, money management, and language development. In conjunction with these programs, the dormitory staffs have set aside a specific time period for homework and during this time will give assistance to students who have difficulties with academic work.

The chief components of a successful program-sharing system are cooperation and communication. The unit supervisors must set an example by cooperating and assisting in program development, student discipline, and total unit goals. Traditionally, the principal made classroom placement decisions and the supervising counselor made dormitory placement decisions. In recent years, these decisions have been made by the principal and supervising counselor working together, with appropriate input from teachers and counselors. Rapport-building activities such as the end-of-year unit party, joint IEP development, the traditional counselor-teacher baseball game, the invitation of counselors to teacher meetings, and vice versa, help to improve communication.

The Intake/Assessment Program

Expanding on its mission to serve multihandicapped deaf children, the DMHU recently established a comprehensive assessment center that evaluates students presently being served, those referred for possible placement, and those referred by other agencies who wish to gain a greater understanding of the child in their care. An intensive assessment is done with each student using the following testing tools:

1. Brigance Inventory of Basic Skills
2. Key Math
3. Los Angeles Diagnostic Center Ordinal Scales of Development
4. Devereux Elementary School Behavior Rating Scale
5. Meadow/Kendall Social-Emotional Assessment Inventory for Deaf Students
6. Assessment of Children's Linguistic Comprehension (ACLC)
7. Developmental Activities Screening Inventory (DASI)
8. Mann-Suttier
9. Illinois Test of Psycholinguistic Abilities (ITPA)

In addition each child undergoes psychological tests, audiological tests, and medical evaluations. When the results are obtained, the educational team of the DMHU meets with parents, the student, and local educational agency representatives to decide the placement and program for the student.

Based on the assessment, an individual educational plan is developed. From this, long-term goals are established that are then broken down into short-term objectives. These short-term objectives are submitted to the supervisors by both the counselor and the teaching staff. Meetings are routinely held with and among the staff to ensure that the total student is being served. An IEP review meeting is held at mid-semester. At that time, the follow-up work identified on the IEP is monitored and, if necessary, new programs are designed.

In the residence hall, program development follows a similar pattern. A typical program will start with the counselor submitting a lesson plan based on program goals that evolved out of the original assessment. This lesson plan is a detailed statement of what the counselor expects the student to achieve, as well as exactly what steps he/she plans to use. The lesson plan then is submitted to the supervising counselor for review. In turn, the plan is reviewed by the unit principal. Upon approval of the program, the counselor is expected to submit an activity report each time a section of the program is taught. This activity report, which includes a statement as to the success or failure of that particular program segment, also is forwarded to the supervising counselor and then is shared with the principal. At the end of the program, a written closing statement in the form of a post-test, report card, or example of the work performed, is submitted to the supervising counselor and the principal. In following this format, the unit supervisors constantly are supplied with information regarding program success or failure and, thus, are better able to make decisions with regard to student placement and goals.

Summary

The California School for the Deaf, Riverside, for 12 years has been at the forefront of educational programming and planning to meet the needs of the multihandicapped deaf child. Through systematic assessment and cooperative program development, the school and dormitory work as a unit to ensure consistency and an opportunity for the learning environment to expand outside the walls of the traditional classroom.

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The Special Education Unit Model at the Lexington School for the Deaf

Thomas Colasuonno

During the developmental stage of the Education for All Handicapped Children Act of 1975 (PL 94-142) a number of extraordinary facts came to light. It was learned that approximately one-half of all exceptional students were not receiving any type of special education services, and, of those receiving services, approximately one-half were not receiving services that were appropriate to their needs (Abeson & Zettel, 1977). Apparently public schools were not meeting the needs of many of these students, did not desire to do so, nor, if wishing to, could they rapidly retool to do so.

In 1978, the Lexington School for the Deaf in New York City established a program for deaf children/adolescents with severe and profound multihandicaps. The student population for this program, referred to as the Special Education Unit (SEU), came from three sources: (a) children who were placed in residential centers for the mentally retarded; (b) preschool youngsters who were not attending school and for whom there was little hope of placement in light of the severity of their conditions; and, (c) deaf children/adolescents who were placed in programs for the deaf, but who, without supportive services to meet their unique emotional and intellectual deficiencies, were not succeeding in these environments and, in fact, were seen as becoming more involved and seriously impaired.

Population

Presently there are 12 students, ranging in age from 3 to 21 years, enrolled in the SEU. These students, in addition to their deafness, exhibit severe behavior disorders such as off-task behaviors, attentional disorders, self-stimulating behaviors, self-injurious behaviors, aggressive behaviors, and noncompliance behaviors. These alone could mitigate against inclusion of these students in public school programs. Lack of trained staff, recent changes in funding regulations, and the present struggle to meet the needs of more mildly disabled students are additional barriers that these students face when approaching the public sector for educational services.

As a private state-supported agency providing comprehensive educational, audiological, and mental health services to the deaf children in New York City, the Lexington School for the Deaf was in a unique position to provide a valuable and needed service where none existed before.

Funded under Section 4201 of the State Education Law, the Lexington School, in general, with its Special Education Unit, in particular, is available to service children from anywhere in the state. Due to state limitations on residential placement, the Lexington School serves the areas of New York City and nearby environs. The SEU, due to the unique nature of its program population, serves a wider geographic area. In the past, it has spread its influence to other states in the Northeastern region in an attempt to meet the needs of other underserved students.

Upon referral from the State Education Department, students are given a complete evaluation of their potential. An interdisciplinary assessment, including medical, psychological and emotional testing, an in-depth review of medical and educational history, and an interview with the appropriate persons and/or agencies involved with the child are given. A complete, qualitative and quantitative profile evolves out of this process. This information is discussed referent to the ability of the Lexington School to build on the unique strengths and to address the unique needs of the particular child. Recommendations are reported back to the State Education Department and from there to the originator of the referral—a parent, school district, or the Committee on the Handicapped.

The SEU is only one of six departments in one of three divisions of the Lexington School for the Deaf. A large number of support services are available to the program through the school. These include speech and hearing therapy, mental health services, medical and dental care, vocational rehabilitation, and physical education. At the present time, no other program in New York state provides these services to the population served by the SEU.

Staff

Due to the severe nature of the children's need, the Lexington School has found it necessary to staff the department with a unique group of professionals and paraprofessionals (five of each). The unit employs an applied behavioral analysis component in all areas of the curriculum. The focus has been on assisting teachers to develop instructional techniques based on principles of learning. The students in the unit exhibit a wide array of inappropriate and unpredictable behaviors for which a teacher must be able to develop a large repertoire of teaching techniques. For example, the principle of reinforcement can be described as anything that increases the strength of a behavior. What is reinforcing for one child, though, may be punitive to another. Therefore, teachers must select specific reinforcement techniques appropriate to individual student's needs, based on principles of reinforcement. This is considerably different from dealing in techniques of instruction alone.

Staff training takes place in group

"Without this training, teachers may use a few techniques and may not be able to generate new ones when students engage in atypical displays."

meetings as well as through on-the-job consultation. Demonstration, modeling, and discussion in the actual classroom help to guarantee the success of behavioral programs. In this way teachers are assisted in applying behavioral principles to classroom activities. Without this training, teachers may use a few techniques and may not be able to generate new ones when students engage in atypical displays. The consistent application of this daily inservice model adds precision and accountability to the classroom environment in dimensions not often found in education. In addition, the school employs the services of a university-based consultant on a part-time basis. The consultant's role is a combination of teacher-trainer, parent-trainer, and on-site evaluator of the program throughout the year.

Parents

As a day program, the SEU is responsible for only a small proportion of any given 24-hour period. Therefore, parental cooperation and involvement in the education of their children is an integral part of the program. Parents meet on a weekly basis with the consultant to discuss (a) general principles and techniques of behavior management, (b) the implementation of these techniques in their interactions with their child, and (c) the ways in which both school and home can work closely together to provide a consistent environment.

In addition to responding to individual parents' concerns, the consultant uses a programmed text to instruct general behavior management principles (see Becker, 1968). Parents report that this text has been useful to them, not only with their disabled child, but with their other children as well. This unanticipated outcome has increased the probability that parents of the students in the SEU will become more proficient in the application of behavioral techniques in their home.

The meeting with the consultant is also an opportunity for parents to discuss their own unique concerns and problems in parenting and coping with other facets of their life. The ability of school and home to work together is seen as a key to the success presently experienced by the SEU in meeting the needs of the entire family.

Training

In addition to meeting the direct needs of the children, their families, and the staff of the SEU, the unit also trains other individuals and agencies who serve multihandicapped children. Through a federally funded program (Assistance in Programming and Training), teachers and administrators from special programs throughout the United States attend on-site training sessions to experience the SEU program model. They then return home to attempt replication through directed assistance from the SEU. In this way, more children are served, and a greater chance for early detection and intervention is made possible.

Summary

In response to a documented need in the state of New York, the Lexington School for the Deaf established a program for a population that was, at the time of inception, either unserved or inappropriately and inadequately served by existing educational environments—the severely multihandicapped deaf student. The school currently provides a structured, behavioral, therapeutic program for 12 day students and their families. Without this program, these students would be kept at home or serviced in institutions of various description throughout the state.

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The Education and Placement of Deaf-Blind Students: Current Issues and Recommendations

Michael D. Orlansky

Professionals who serve deaf-blind children are currently being challenged, as never before, by questions of appropriate educational placement and programming. The reduction in federal Title VI-C funds for direct service delivery, the possible modifications to the federal mandate that "related services" be provided, and the high per-pupil cost of educational programs for deaf-blind students are among those factors which suggest that important decisions affecting children's placement will be made increasingly at the local and state levels. The U.S. Supreme Court's first review of Public Law 94-142 has resulted in a decision that is being widely interpreted as limiting local school boards' responsibilities for educating handicapped children (Babcock, 1982, in reference to *Hendrick Hudson District Board of Education vs. Rowley).* For these and other reasons, educators of the deaf-blind are presently re-evaluating the concept of *least restrictive environment* as applied to their students.

In the past, and in some instances even at the present time, deaf-blind children, youth, and adults have suffered from long-term isolation in narrow treatment settings, removed from interaction with nonhandicapped and less severely handicapped individuals (Martin, 1978; Orlansky, 1981). Smithdas (1981) points to the isolation that he and other deaf-blind people experience:

> The senses of sight and hearing are unquestionably the two primary avenues by which information and knowledge are absorbed by an individual, providing a direct access to the world in which he lives.... When these senses are lost or severely limited, the individual is drastically limited to a very small area of concepts, most of which must come to him through his secondary senses or through indirect information supplied by others. The world literally shrinks; it is only as large as he can reach with his fingertips or by using his severely limited sight and hearing, and it is only when he learns to use his remaining secondary senses of touch, taste, smell, and kinesthetic awareness that he can broaden his field of information and gain additional knowledge. (p. 38)

The Least Restrictive Environment for Deaf-Blind Students

It is clear that a great deal of progress has been made during the past decade or so in identifying deaf-blind children and in extending educational services to them. Much of this progress can be directly attributed to the establishment of regional and state centers for services to deaf-blind children in 1969. These centers have been supported to a substantial degree by federal funding. Whereas fewer than 100 deaf-blind children were served in specialized educational programs prior to 1969, recent data indicate that over 6,100 deaf-blind students, age zero through 21, now are being educated in a wide variety of settings (Dantona, 1979; Lewis, 1981).

Despite the evident increases in the number of students enrolled in special programs for the deaf-blind, there is a general consensus among practitioners in this field that our current approaches to education frequently fall short of providing deaf-blind students with those skills and behaviors that will enable them to show demonstrable movement along the continuum from dependency to independence (Hammer, 1977). Teachers, parents, rehabilitation specialists, and other personnel are particularly concerned over the fact that many deaf-blind students who complete educational programs, or are terminated from them because of age or other restrictions, are not able to make a successful transition into living and working situations that are productive and personally satisfying. This situation is attributable, in part, to the less-than-adequate cooperation between educational and rehabilitation agencies in serving the deaf-blind population (Tweedie & Baud, 1980; Wolpert, 1978; Wyrick, 1979). However, it may also be viewed as having its roots in decisions that are made about a child's educational placement. As Stephens, Blackhurst, and Magliocca have observed:

> What a least restrictive environment is, is a matter for individual determination. Some instructional and social environments will be less restrictive to growth and development of the individual than others. This depends on an array of individual variables including abilities, skills, and motivation. So the selection of an instructional environment for each student must be done separately. Education of the exceptional student must be delivered in the least restrictive environment and, as P.L. 94-142 goes on to specify, with as much involvement with nonhandicapped children as possible. (1982, p. 11)

Recent observations of educational programs for deaf-blind children and follow-up reports on deaf-blind adults who have completed such programs imply that deaf-blind students often are not served in the least restrictive or most appropriate environment. After conducting an in-depth interview project with nine deaf-blind adults for the National Academy of Gallaudet College, Yoken (1979) concluded that the deaf-blind are a largely invisible minority, and that "we have barely scratched the surface" in providing adequate programs of education and habilitation (p. 2). Yoken found that few deaf-blind adults participate in social and community activities, and that while deaf-blindness inevitably imposes a high degree of isolation and dependence, "the loneliness and alienation is massive and unrelieved" for most deaf-blind people (p. 157). Orlansky and Heward

"Traditional normative approaches to assessment are usually inappropriate for use. . . ."

(1981) interviewed 53 disabled Americans, including two adults who became deaf-blind in childhood. While both of these adults were successfully employed and living independently, they recalled many instances from their school years in which teachers and peers were not sensitive to their special needs as deaf-blind students.

Walsh (1981) offers a comprehensive review of educational theory and practice as currently used with deaf-blind students, summarizing her findings as follows:

> At the present time, the best we can say about progress achieved is that we have accumulated bits and pieces of information, some helpful, some not, and generally employ an eclectic approach in the educational process. We still have not developed a consistent body of knowledge concerning this double disability and its effects upon the learning process. (pp. 25–26)

Recommendations for Educational Placement and Planning for Deaf-Blind Students

As Haring (1978) told a conference of professionals serving deaf-blind children, it is important to re-examine our notions of service delivery from time to time. The education of students with multiple and severe handicaps is "a multifold issue taking in questions of administrative organization, establishing programs, solving geographical and funding problems, deciding where to place the children, and, of course, what and how to teach them" (Haring, 1978, p. 1). Questions of appropriate and comprehensive approaches to the educational placement of deaf-blind students are especially critical today. A recent review of programs for deaf-blind children, prepared for the National Association of State Directors of Special Education, confirmed that most states are curtailing their use of federal funding, and that they "are now capable and organized to develop, administer, and deliver a range of services to deaf-blind children and to the people who serve them" (Lewis, 1981, p. 7).

The following recommendations, based upon first-hand observation of several programs for deaf-blind children and youth, are presented with the hope that they will facilitate placement of these students into programs that are as appropriate as possible to the needs of each student, but are not unduly restrictive and isolating. The recommendations are especially directed to those who have responsibility for planning and coordinating services for deaf-blind students at the state level, but may also have relevance to professionals who work with multihandicapped individuals in various other roles and settings.

Assessment of Students

Accurate and carefully documented *hands-on* assessments of deaf-blind students can contribute significantly to the quality of educational programming. When the assessment process results in the generation of specific educational goals and suggested activities, teachers will be able to implement appropriate instruction in such areas as communication, concept development, and behavior management. It is desirable that basic assessments concentrate on observable, functional skills that a deaf-blind student can demonstrate, such as the ability to make simple perceptual discriminations, or to imitate specific gestures or signs. Traditional normative approaches to assessment are usually inappropriate for use with children who have visual, auditory, and other impairments, and seldom furnish information that teachers can use.

Programs for the deaf-blind in a particular geographic area share certain common concerns and typically are linked with each other by a centralized administrative agency. For this reason, many states and regions now have one or more professionals who are considered specialists in the assessment of deaf-blind students. These individuals—usually psychologists or educational diagnosticians who have developed an interest in the deaf-blind and a familiarity with their communication and other specialized needs—can be valuable resources to programs. Specialists who put a great deal of time and effort into their evaluations and who make an attempt to get to know each child invariably enjoy a high degree of credibility and respect among teachers. It is recommended that states and regions identify competent assessment specialists and expand the involvement of these professionals in providing inservice training to other professionals, such as school psychologists, speech and language pathologists, audiologists, physical and occupational therapists, optometrists, and teachers who are involved in assessing and serving deaf-blind children. Such cooperation, over a period of time, would increase the deaf-blind student's access to a network of professional personnel and would enable more programs to provide appropriate assessment and effective instructional activities.

Many deaf-blind students have etiologies resulting from the maternal rubella epidemics of 1963–1965; they are now approaching age 21. It is especially critical that their assessments result in educational plans and strategies that can help them function as independently as possible in realistic vocational settings.

"This heterogeneity of students within programs and the lack of communication and cooperation among programs in many states create certain practical problems for teachers."

The assessment specialist for these students, whenever possible, should be accompanied by a professional in the field of vocational rehabilitation. Although the vocational rehabilitation specialist may or may not have had extensive experience with deaf-blind persons, he or she will be familiar with the methods of assessing the vocational and independent living potential of handicapped people and will know of agencies in the state that provide training, employment, independent living, and other support. Coordination of educational and vocational assessments would be most beneficial in helping teachers plan much-needed prevocational-training activities, and in improving long-range planning for deaf-blind students.

Coordination of Services

Greater cooperation and clearer definition of specific program goals should be encouraged among all programs that serve deaf-blind students in a particular state or other regional unit. The present situation in many states finds a rather wide range of students at each program, in terms of age, functional level, mode of communication, and other important variables. There may be a few rational explanations of *why* a particular student was originally placed at one program within a state rather than at another. Each of several programs may currently serve severely retarded students, as well as those who are found to have high potential for communicative, academic, and vocational development. Each may have students who require extensive medical and physical attention (including nonambulatory students), as well as those who are in good physical condition. Most probably, the reason for original placement had to do with a student's geographic location, with the programs available in the state at the time of placement, and perhaps, to some extent, with parental preferences. Movement to another program does not occur often.

This heterogeneity of students within programs and the lack of communication and cooperation among programs in many states create certain practical problems for teachers. It is difficult to manage effectively groups of deaf-blind children who vary extensively in age, functional level, communication, and behavior. Lesson planning for students who are vastly divergent necessitates the use of resources and materials beyond what is normally reasonable and affordable for a single classroom. Additionally, during instruction teachers tend to emphasize the subjects in which they are most competent and interested. By changing teachers, students have a better opportunity to explore more subjects in depth. Class changes also provide the benefits of exposure to other personalities. This may be crucial when a student is grouped consistently with another student whose aggressive behaviors monopolize a teacher's time.

A possible plan for a more unified approach to programming for deaf-blind students on the state or regional level might work in the following manner, assuming that there are three programs for deaf-blind students operating in facilities over which a state or regional agency has some control.

Program A has a population consisting mainly of preschool and early elementary-age deaf-blind children. The emphasis is on careful assessment of each child's vision, hearing, and other physical and educational needs, leading to appropriate intervention plans. The program is strong in the areas of communication, motor development, play activities, the teaching of basic self-help skills, and parent education. Interaction with nonhandicapped children is encouraged wherever possible.

Program B serves deaf-blind children of intermediate age (approximately 8 to 14). The program is varied, and includes academic and prevocational training, as well as continued attention to communicative development and self-help skills. In order to enter Program B, children should have developed some degree of receptive and expressive communication, and should be on the way toward acquiring independence in such areas as toileting, dressing, eating, and mobility.

Program C consists of an older group of deaf-blind students, aged approximately 15 through 22. This program emphasizes vocational skills, offering training in settings that closely resemble actual agencies which employ disabled workers. In some cases, students may work in community settings for part of the school day. Cooperation between Program C and vocational rehabilitation personnel encourages realistic training while the student is in school and results in a specific placement plan for employment and living after the student attains age 22. As many students as possible live in semi-independent settings on or near the campus. They are responsible for housekeeping, shopping, cooking, traveling, and other relevant tasks, under the supervision of teachers and houseparents.

Under a system such as the above, it would be possible (and desirable) for a deaf-blind child to begin his or her education in Program A and progress to Program B and then Program C. Each program would develop a set of suggested entrance and exit competencies that students would achieve. Representatives of all three programs would meet with each other

"Implementation of a more unified approach to educational planning for deaf-blind children would present certain organizational and fiscal problems."

periodically to review information on *all* deaf-blind students in the state or region and to offer their input in placement decisions.

Of course, children cannot be arbitrarily moved from one program to another without following legal and ethical guidelines. Parents would be involved in all placement and planning decisions, as would a representative of the child's local school district. The placement system should be flexible enough to accommodate special cases, such as a child moving into the state, an older student who requires training in very basic skills, and a parent's preference for having a child receive education in the program nearest the home. Many parents would welcome a comprehensive, well-structured, and cooperative approach to educational programming for deaf-blind students.

Implementation of a more unified approach to educational planning for deaf-blind children would present certain organizational and fiscal problems. This process calls for increased cooperation between educational facilities which historically have served more or less separate populations (e.g., schools for the blind, schools for the deaf, institutions for the mentally handicapped, local public schools). The A-B-C approach probably would operate most efficiently in states where the cooperating facilities are in relatively close proximity to the major centers of population and to each other. Large states may be able to identify several regions in which agencies could cooperate in serving deaf-blind students of varying ages and functional levels.

The cooperating educational programs need not be residential in the traditional sense. Many exemplary programs already exist to serve preschool multihandicapped children and their parents in both home and school settings. It is desirable for students of all ages to maintain regular contact with their families and communities; responsibility for transportation between home and school is assumed generally by the local school district. Older deaf-blind students are benefiting from inclusion into newly organized community group homes and vocational facilities. As Arkell (1982) observes, "multiply involved hearing-impaired students should constantly be required to perform in varied and increasingly complex environments" (p. 207).

Guldager (1981) outlines an excellent model of most-to-least restrictive residential and training alternatives for deaf-blind students, as practiced at the Oak Hill School in Connecticut. The model includes guidelines for obtaining housing and funding. Guldager states that community placement is no more costly than institutionalization and expresses the belief that "*all* multihandicapped persons can live in the community if a full range of good programs are available and are continued throughout a person's life" (p. 32).

This approach emphasizes serving deaf-blind students in the home and community wherever possible. However, in cases where deaf-blind children come from remote areas or from families who are not able to accommodate their children at home for any of a variety of reasons, residential programs will continue to fulfill a useful function.

No recommendations regarding the specific focus of actual programs will be offered here because that is a matter best left to the agencies directly involved. Preliminary discussions on the advisability of an A-B-C approach could be held in states or regions, with each program invited to indicate areas in which their facilities and staffs could serve deaf-blind students most effectively. If a structure such as this evolves, it should be developed *by* educators of deaf-blind children, not imposed upon them.

Initial Assessment and Referral

Concurrent with the need for greater structure and clearer definition among education programs for deaf-blind children is a need for states to develop and implement a procedure for locating and identifying deaf-blind children. States also have the responsibility for assisting families in obtaining interdisciplinary evaluations (as early as possible in the child's life) from professionals who are familiar with the assessment of multihandicapped children.

Most states have established guidelines regarding the personnel and agencies who are responsible for coordinating the diagnosis and evaluation of deaf-blind children in the state. A team of professionals (usually including an ophthalmologist, optometrist, audiologist, psychologist, educational specialist, social worker, and others) should be identified in each state, so they can be called upon to provide evaluations and assistance in the development of appropriate educational programs for deaf-blind students.

The need for improved diagnosis and referral procedures is particularly acute as it relates to initial referrals; that is, *new* deaf-blind children being born or moving into a state. When a child suspected of having visual and hearing impairments comes to the attention of a school district (possibly through a local physician, health clinic, or social worker, or directly from the parents), there should be a clearly defined procedure for (a) obtaining an appropriate series of eval-

> "It would be most beneficial if a team of specialists could be identified as primary evaluators for deaf-blind children."

uations; (b) reporting the results of those evaluations to the state department of education, local school district, and parents; and (c) using the evaluations as a basis for planning a program of education and training in the least restrictive appropriate environment. Information describing this procedure should be disseminated to school districts, medical centers, and other appropriate agencies.

It would be most beneficial if a team of specialists in each state or region could be identified for the purpose of serving as primary evaluators for deaf-blind children. By having such a team in a central location, parents could bring their children for a series of evaluations over a two- or three-day period. The purpose of these evaluations would be not only to determine whether or not a child is deaf-blind, but also to assist in developing a child's educational placement and specific goals and objectives.

A centralized approach to evaluation, with one person serving as case manager, is less costly to parents in terms of time and travel (in some states, initial evaluations are funded by the state or regional center), and gives specialists such as physicians, ophthalmologists, audiologists, and physical therapists the opportunity to confer with each other. This would lead to a coordinated set of placement and educational recommendations, rather than the isolated (and sometimes contradictory) findings that often result from scattered one-at-a-time evaluations.

Advisory Committee

The formation of a state advisory committee on deaf-blind children would be an important and useful step in determining current and future directions for educational programs for deaf-blind students in that state. Membership of such a committee should include, but not be limited to:

1. administrators of all programs serving deaf-blind children in the state,
2. teachers of deaf-blind children,
3. vocational rehabilitation personnel,
4. parents of deaf-blind children,
5. representatives from local school districts,
6. service providers from the state or regional center for deaf-blind children,
7. deaf-blind adults,
8. personnel from allied agencies serving the deaf-blind (such as the state commission for the visually handicapped or state organization for the deaf), and
9. other interested personnel.

Through meetings and ongoing communication, more effective cooperation and planning could be facilitated. Those people with the responsibility for planning, funding, and coordinating educational services would thus have a useful vehicle for obtaining information pertinent to the present and anticipated needs of deaf-blind students in their state or region.

Summary

Educational programs for the deaf-blind have made notable progress in identifying and serving their students. This article has presented several suggested approaches to assessment and education which, it is hoped, will enable programs to utilize their existing resources more efficiently while meeting the individual needs of each student. Since deaf-blind children and youth are a relatively small but heterogeneous population, it is especially important that they have access to varied interdisciplinary services. Thus a plan has been outlined for encouraging cooperation and interagency referral among educational programs that serve deaf-blind and other multihandicapped students.

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Future Trends in Deaf-Blind Education – Revisited

Hank Baud
David Tweedie

In 1979 a study was undertaken to provide direction for the field of deaf-blind education to meet the challenges of the 1980s. This study attempted to glean information from statements made by professionals who were defined as leaders in the field of deaf-blind education. These professionals were asked to describe trends that would be desirable for providing services to deaf-blind children and to give some indication as to the likelihood of occurrence of these trends.

The 1979 study used a modified version of the *delphi technique* and was based on work by Cyhert and Grant (1970) in teacher education and Prickett (1977) in education of the hearing impaired.

The modified version of the delphi technique requested statements from influential individuals in deaf-blind education. The 67 responses to the first questionnaire generated 439 trend statements that evolved into 70 generic statements. These 70 statements were sent out a second time with the request that a rating on a 7-point Likert-type scale be given for each statement as to likelihood of occurrence and desirability of occurrence. The results of these data were reported at various professional meetings and were published in the October 1981 issue of the *American Annals of the Deaf.*

Since that study was completed, the philosophy and policies of the current federal administration, especially in the area of funding, as well as recent litigation in the area of special education could have impacted upon the statements and conclusions in the previous study. Therefore, a follow-up study was conceived to update statements made in the previous study as to desirability and current status of the educational trends. One would assume that, over time, certain opinions would change and that certain items would be more desirable at one point in time than another. The authors believed, however, that the impact of Reaganomics and the possibly devastating effect of the dismantling of the Department of Education would seriously impact on deaf-blind education and, consequently, the desirability (educational) status of important trend items.

In order to obtain present programming concerns, a 56-statement questionnaire was sent out. Those items that appeared on the desirability tables in the results of the previous study (Tweedie & Baud, 1981) provided the stimulus material. This questionnaire was sent to the respondents of the previous study. It requested ratings of the statements on a 7-point Likert-type scale as to the desirability of each statement and also asked for decisions about the status of occurrence of these statements. Status decisions were (a) that this item has already occurred, (b) that this item is still likely to occur, or (c) that this statement is no longer likely to occur.

Of the 81 questionnaires sent out, 45 were returned completed, for a return rate of 55%. Five additional questionnaires were returned after the deadline and were not included in the final summaries. Each item in the questionnaire was rank-ordered for desirability. Those with a mean of 5 points and above were defined *desirable.* Those items with a mean below 3.99 were defined *undesirable.* Status of occurrence was determined by reporting the answer chosen by a minimum of 60% of the respondents. For example, if 60% of the respondents gave the rating "A—this item has already occurred," that was accepted by the authors to be a definitive statement about occurrence.

Three items have occurred since the last study (Tweedie & Baud, 1981) that were judged highly desirable; these were "greater emphasis on communication skills" (mean=6.66), "self-help skills" (mean=6.51), and "motor development" (mean=6.56). (Statistics adjacent to each item represent their mean score of desirability.) These items were rated relatively high in the previous study but were not indicated as having already occurred.

Two statements that have already occurred but have a low degree of desirability were "cost effectiveness will become a major concern in deaf-blind programming" (mean=2.40) and "federal funding for direct service programs will decrease" (mean=2.31). These are related to the reduction in federal funding for state service programs and the concern that cost effectiveness will become a greater issue than it is at present. Apparently the "reduction in spending" philosophical climate of the current federal administration already has impacted upon programs serving deaf-blind children by decreasing federal funding for direct services. Also, placing a higher premium on fiscal management is more apparent than was previously indicated.

Table 1 lists 20 statements that respondents indicated have a high degree of desirability and are still likely to occur. These statements are comparable in ranking to those desirability statements previously obtained (Tweedie & Baud, 1981). Once again, these statements indicate the need for cooperation between agencies and communities through development of resources, community-based living, and community awareness of this population. The need for better health care, socialization skills, and communication technology also received high desirability ratings.

The only statement with positive desirability which had no clear indication of status was: "Local and state funding for direct service program-

"The field is saying that recent national trends have led to serious questions about local and state funding for direct service programs."

Table 1
Trends in the Field of Deaf-Blind Education That Are Still Likely to Occur and Have a High Desirability (Defined as 60% +; Mean 5+)

Item	Mean Rating
Cooperation between rehabilitation agencies and education agencies will increase.	6.77
Community resources for the deaf-blind population will increase.	6.71
There will be an increased emphasis on abilities rather than disabilities.	6.68
There will be an increase in the number of sheltered workshops available for deaf-blind individuals.	6.62
There will be better health care available for the deaf-blind students.	6.62
The number of community-based group-living facilities will increase.	6.57
There will be greater emphasis on vocational training.	6.57
Improved teaching material will be developed.	6.57
Socialization skills will receive greater emphasis in the programming of deaf-blind students.	6.55
Increased attention will be given to the development of leisure time activities.	6.55
There will be an increase in sensory integration training for deaf-blind students.	6.53
Communication technology for deaf-blind students will increase.	6.53
Program accountability will receive greater emphasis.	6.44
Orientation and mobility skills will receive greater emphasis in the programming of deaf-blind individuals.	6.44
Adaptive equipment for deaf-blind students will become more readily available.	6.42
There will be an increase in community awareness of the deaf-blind population.	6.40
More sophisticated ophthalmological assessment techniques will be developed.	6.37
Sex education programs for deaf-blind students will increase.	6.35
More sophisticated audiological assessment techniques will be developed.	6.28
Higher functioning deaf-blind students will be integrated into educational programs not specifically designed for deaf-blind population.	5.80

ming will increase" (mean=6.76). Again we believe that the field is saying that recent national trends have led to serious questions about local and state funding for direct service programs. Diminished revenue sources from the national level and statements made about block grants to states, are confusing professionals in the field about where direct service funding will be obtained.

Table 2 presents items of low desirability that, in the opinion of the respondents, still will occur. These items could be interpreted as the professional fears of the respondents. A decrease is apparent in support services to mainstreamed students, in programming for students ages 5-21, and in the overall quality and coordination of programming for deaf-blind students. Although it is not possible to determine from this questionnaire whether or not these decreases are the direct result of changes in the national picture, these statements do represent the real concerns of the respondents about the current national situation and the future of deaf-blind education.

The results of this follow-up questionnaire indicate that statements related to desirability of occurrence have not changed appreciably over time. In addition, status statements now present a more current picture in light of the changing economic and political environment of the country.

Those items that already have occurred probably provide the most clear indication of trends in deaf-blind education since data were collected for the previous study. Those items that are still likely to occur with high desirability or low desirability indicate the reliability of these opinion statements over time and lend direction to what is anticipated in deaf-blind education in the near future. Interestingly, no item reached the criterion level of 60% concurrence for

Table 2
Trends in the Field of Deaf-Blind Education That Are Still Likely to Occur and Have a Low Desirability (Defined as 60%; Mean 3.99-)

Item	Mean Rating
Emphasis on academic skills will decrease.	3.93
Teacher training will emphasize severe and profound handicaps rather than deaf-blindness.	3.20
Deaf-blind students will be assimilated into programs for severely and profoundly handicapped students.	3.08
There will be a decrease in residential programs for deaf-blind individuals.	2.53
The student/teacher ratio (class size) within deaf-blind programs will increase.	2.31
The attrition rate of teachers of deaf-blind children will increase.	2.11
Due to mainstreaming efforts there will be a decrease in individualized instruction.	2.02
There will be an increase in the number of over-21 deaf-blind students returning to or being admitted to state institutions.	1.98
State coordination of deaf-blind programs will decrease.	1.75
There will be a decrease in programs for children 5-21 years of age.	1.71
There will be a decrease in support services provided for deaf-blind students in "mainstreamed" programs.	1.67
The overall quality of deaf-blind programs will decrease.	1.56

the status category of "no longer likely to occur." This finding may be interpreted to mean the respondents believe that the statements previously generated in the study completed in 1979 are still likely to occur or have already occurred.

Though the field of deaf-blind education has changed over the past three years and may change radically over the next several years, the items that are deemed desirable have been constant and in all likelihood will continue to be considered desirable. Professionals serving this population appear to know what they need to appropriately serve this population. Whether or not desirable items actually occur may well determine the educational future of deaf-blind children.

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A Look at the Cognitive and Language Development of Deaf-Blind Children

Corinne K. Jensema

Congenital deaf-blindness thwarts normal acquisition of language to a greater extent than the simple additive impact of visual and auditory impairments (Barraga, 1973; Kennedy, 1974; Lennenberg, 1967). The interaction of the conditions compounds their effects on language and conceptual development and causes further impediments to normal growth in these areas.

A hearing-impaired infant is deprived of the greatest avenue through which oral communication is established—the auditory channel. Under normal circumstances a baby is constantly bombarded with spoken language. In the course of normal language development, the child invents, tests, and then abandons or retains a series of hypotheses until his or her language duplicates the phonological, grammatical, and semantic features of the language he or she hears (McNeill, 1970).

Access to this process is severely limited and in some respects eliminated for the hearing-impaired child. When the hearing loss is sufficient to cause primary dependence for input on visual modalities, the physical environment from which this input can be processed in any given moment is reduced. The auditory mechanism responds to a 360° environmental sphere of influence and remains alert even during the sleeping hours. The visual field is somewhat under 180° and disappears, literally "with the blink of an eye."

For children trained in an oral-only (speechreading) environment, accurate communication is complicated by the identical mouth formation of many sounds. Deaf children often understand only 5% of what they attempt to speechread (Vernon, 1967). The addition of manual communication (sign language, fingerspelling, and gestures) reduces the guesswork but rarely conveys all of the features of spoken language received by hearing children.

Another factor that leads to retarded language acquisition in deaf children is the frequency of late diagnosis. A thorough grammatical understanding of a native language is virtually completed by a hearing child during the first few years of life (McNeill, 1970). The ability to quickly assimilate the rules of language is dramatically diminished as age increases. Therefore, if a hearing-impaired child is not introduced to language for several years, this critical stage of language learning is missed and the child progresses at a much slower rate.

A visually impaired child faces a different kind of problem during language development. Here, of course, there is no lack of opportunity to obtain a complete language system; however, the ability to attach conceptual meaning is curtailed by the absence of visual experience and reduced mobility.

Barraga (1973) explains that visual perception involves examining an object, distinguishing its essential features, understanding the relationship between the elements, and integrating the information to construct a meaningful visual image. As the visual analytic process matures, the child begins to identify objects as distinct from his or her spatial environs and as possessing specific behavioral features. Experience with observation of an object under various circumstances imbues a child with knowledge of object conservation (that an object remains physically intact even when out of view) and operative reversibility (that an object can be restored to its original position) (Stauffer, 1975). Development and schematization of vision, which are originally derived from overt participation, subsequently are transformed into covert mental operations. This enables the child to cognitively manipulate objects retrospectively or anticipatorily.

Consequently, the blind child's communication is limited not by its verbal content, but by a lack of visual experiences with the physical world. It is known that adequate information about the formation of some objects can be conveyed on the basis of interaction and intersubstitution of other sensory modalities (Zemtzova, Kulagin, & Novikova, 1962). However, decreased mobility and inaccessibility to oversized or dangerous objects precludes many of these experiences. Therefore, a common ground of concepts is notably missing from daily dialogue.

When children possess a combination of deafness and blindness, they not only have an inadequate conceptual understanding of relationships and processes, but also do not have a linguistic system to assimilate knowledge relayed by another individual. The compensatory sensory feedback mechanisms, which serve to evaluate and correct comprehension as a result of performed action, are sharply limited (Zemtzova, Kulagin, & Novikova, 1962).

Rothschild (1962) lists a number of ways in which the dual handicap further retards the communication process.

1. The kinds of experiences a child may have will be more limited in scope and less frequently encountered.
2. The inventory of accumulated impressions from the past, being smaller than normal, will increase the difficulty of appraising new situations.
3. Once a deaf-blind person has attained a level of linguistic competence that enables him or her to use an interpreter, he or she still will be impeded by the slowness of this process and still will not be able to perceive the Gestalt of the situation.

"The congenitally deaf-blind child is by definition severely cognitively retarded."

Theories of Language and Communication Development

Speculation about the relation of sensation to cognition has intrigued philosophers for centuries and developmental theorists, linguists, and neuropsychologists in more recent times. Their hypotheses and findings provide some insight into the communicative abilities and methodological preferences of deaf-blind children. Mental abilities notwithstanding, these children represent the most seriously affected group because of the absence of receptive avenues to communication.

Philosophical Theories

George Berkeley's *New Theory of Vision,* written in 1709 (see Turbayne, 1963, for a recent reprinting), contains one of the most lucid and radical expressions of empiricist philosophy. Aptly, his theories center around vision, but he draws an analogy to language which is useful for the purposes of this research. He argues that depth perception is derived from a memory of tactual experience or proprioception since two points of different distance in space actually are projected on a single point on the retina. For him, all ideas are derived from experience and cannot exist a priori. If evidence justifies the use of a word, then the word is correctly used. Meaning is arbitrary and is based on prolonged experience with associated perceptual ideas.

In 1842 Samuel Bailey published "A Review of Berkeley's Theory of Vision, Designed to Show the Unsoundness of that Celebrated Speculation." He contended that some ideas are innate and some abstract. Experience can suggest abstract ideas, and a person's statements relative to personal experience are correct only in so far as they refer to the correct abstract ideas. The meaning of a word is an abstract idea with which perceptual ideas are associated. The association is considered arbitrary, but the meaning (abstract idea) is not (McNeill, 1970).

Implications for communication and language development of deaf-blind children can be derived from this discussion. If Berkeley's theories are compatible with truth, then sensory-deprived children are incapable of developing many kinds of abstract ideas. Without a commonality of experience, there can be no basis upon which to develop communication. If meaning is arbitrary and perception limited, then there can be little consensus of thought and a formal language system would be substantially less useful.

Bailey's contentions seem to hold more hope for the cognitive and communicative abilities of deaf-blind children. If some ideas are innate and others exist in the abstract, then there can be mutual ground upon which to build communication. Words and phrases can be associated with abstract ideas without these abstract ideas being derived from sensory perception.

Developmental Theories

Cognitive developmental theorists, the most well-known of whom is Jean Piaget, have contributed significantly to the understanding of the relation of perception to thought. According to Piaget (1964) and his disciples, the source of intellectual operations resides in the sensorimotor period (the period of development from birth to about age two). During this period the means for cognitive functioning consist of precepts (sight, sound, feel, taste, smell) and movements (crawl, walk, reach, grasp). Interaction with the environment through perceptual sensory immediacy catalyzes elementary forms of logic such as conservation and operational reversibility. Overt actions are gradually transformed and schematized into covert mental operations. Stauffer (1975) states that

> by the end of the sensori-motor period, thought, with its roots in action, has permitted a child to overcome initial perceptive and motor egocentricisms. He can attain practical ends by activities that yield cognitive success and affective pleasure. (p. 16)

The importance of sensorimotor schemata in developing and structuring thought continues from the initiation of intellectual operations through the constitution of formal logic. Piaget (1967) writes:

> It is permissible to conclude that thought precedes language and that language confines itself to profoundly transforming thought by helping it attain its forms of equilibrium by means of a more advanced schematization and a more mobile abstraction. (pp. 91–92)

If continual opportunities to interact with the environment must exist for a child to develop normal cognitive processes, then the congenitally deaf-blind child is by definition severely cognitively retarded. Using Rothschild's list of communication impedances (1962, p. 384) and expanding upon them, several factors stand out as affecting a child's ability to take total developmental advantage during the sensorimotor period.

1. Deafness and blindness preclude two channels of sensory input.
2. Deaf-blind children are more physically inactive and, consequently, less exploratory because of the dangers involved in interacting with the environment.
3. Opportunities to repeat learning experiences are reduced.
4. Social interaction is limited to a few individuals who make direct physical contact.

The reduction of experiential opportunities within the sensorimotor period will preclude a deaf-blind child from moving into later protosymbolic

> “The arrangement of central sensory functions . . . in the human brain develops according to the contents and conditions of daily activity.”

developmental stages, termed perception and imagery by Myklebust (1964), and symbolic developmental stages, called symbolism and conceptualization.

Linguistic Theories.

The influence of language on thought has been a topic of intense speculation and research for many years (Bruner, Olver, & Greenfield, 1966; Chomsky, 1966; Whorf, 1956), but the influence of cognition on language has been less keenly explored. Sinclair-de Zwart (1968), a protegé of Piaget's, suggested that the grammatical categories of noun and verb are linguistic representations of the final stages of the sensorimotor period, which occur at about 18 months of age. At this time, the child accepts both the existence of objects distinct from self and the difference between objects and actions. McNeill (1970, pp. 73–74) feels that this can be only the first of two possible cases: (a) *a weak linguistic universal*, the reflection in language of a universal cognitive ability; and (b) *a strong linguistic universal*, the reflection of a specific linguistic ability that may not be the reflection of a cognitive ability at all. He alludes to Braine's (1970) description of his two-year-old daughter's manipulation of two nonsense words, one purported to be a verb and the other a noun. Her *noun* functioned syntactically only in that capacity, and her *verb* appeared as either a noun or verb. This would indicate that nouns are strong universals and verbs weak universals.

This argument is important to language development in deaf-blind children. If linguistic universals evolve to express thought, then deaf-blind children would be unable to manipulate language until the sensorimotor period had been completed. The limitations to this eventuality have been previously discussed. If linguistic universals can evolve without thorough differentiation between objects and actions, then rudiments of communication can appear without extensive direct experience.

Neuropsychological Theories

Previously, the discussion has reviewed philosophical, psychological, and linguistic theories that impinge on the question of whether the absence of the two primary sensory modalities would preclude normal language development to an extent whereby selection of communication modalities is of minor importance in proportion to the abilities of the population as a whole. From most indications, limited empirical knowledge of the environment severely affects cognitive and, consequently, language development.

The question of how and to what extent tactile perception can substitute for vision in the perception of objects and phenomena of the outer world has been a topic of international debate. Soviet neuropsychologists and physiologists have contributed extensively through experimentation and theorization to hypotheses of sensory compensation (Anokhin, Note 1; Asratyan, 1953; Leontiev, 1959; Lomkins, 1956; Luria, 1948; Vygotsky, 1956; Zemtzova, Kulagin, & Novikova, 1962). They have concluded that the formation of an image can be carried out on the basis of very limited sensory information—even with the absence of vision, hearing, and speech—through the interaction and intersubstitution of sense modalities (Zemtzova et al., 1962).

To understand the process of intersubstitution of sense modalities, it is necessary to review the cognitive operations of one modality—visual perception.

> Visual perception involves the examining of an object, distinguishing the essential features, understanding the relationship between the elements, and integrating the information to construct a meaningful visual image... as the child searches for meaning and he continues to look, a more analytic process develops in which the object becomes located within a spatial field; it begins to stand out from its background and behaves in a certain way. An object can be said to be fully perceived visually only to the extent that it can be related to some organized shape which remains constant. (Barraga, 1973, pp. 20–21)

Recognition occurs when the mind retrieves its storehouse of perceptual information and assigns a name to this object as a phenomenon distinct from all others.

The arrangement of central sensory functions (“analyzers”) in the human brain develops according to the contents and conditions of daily activity (Zemtzova et al., 1962). In other words, neurological analyzers and synthesizers develop for those sense modalities for which the human body has practice. The development of these analyzers and synthesizers actually results from intra-analyzer and interanalyzer connections with the central nervous functions (“safe-analyzers”) and not directly from the elementary sensory functions, as might be supposed. In the case of the deaf-blind person, sensory input (“afferentiation”) is provided by tactile and kinesthetic cues which are transferred, in turn, via the “safe-analyzers” to substitute sensory processes. These substitute sensory processes develop in much the same way as do “analyzers”—on a principle of repetitive learning and conditioned reflex.

For blind persons, the uniqueness of the functioning of the neural system is evident in the decrease of cortical neural excitation and the increase in excitation in subcortical neural structures (Zemtzova et al., 1962). This peculiar occurrence represents a neuro-compensatory solution and further explains vegetative

> **"The theories presented offer insights into educational strategies that can tip the scales in favor of academic success."**

reactions of other sensory channels. In other words, the nerves stimulate areas of the brain that can provide commensurate information and leave to rest those pathways that cannot provide useful information due to the loss of a sensory ability. This research would indicate that the process of substitution and selection of sense modalities for communication with deaf-blind children need not be predicated on biological predeterminism. Educational activity that advocates particular sensory experiences can be responsible for rearrangement and substitution of cortical operations.

Conclusions

Recent research and theorization on cognitive and language development have shed light on why linguistic and performance abilities of deaf-blind children appear so limited. Although the impediments to normal growth seem to present overwhelmingly negative odds, the theories presented offer insights into educational strategies that can tip the scales in favor of academic success. Use of teaching strategies such as those of Van Dyk (1965), curricula such as *Language Development and Intervention with the Hearing Impaired* (Kretschmer & Kretschmer, 1978), and assessment tools such as that of Uzgiris and Hunt (1975) (which is based on Piaget's six stages of cognitive development) all provide the deaf-blind child with training that combines motor patterning cognitive exercises and language stimulation. Analyses of the deaf-blind child's preferred modalities of learning and expression and the factors that contribute to these selections point the way to potential avenues of successful communication.

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Investigating the Cognitive Processes of Deaf-Blind Students through Auditory and Visual Channels

Ann Smisko
Tom Valentine

The recent development of improved methods of assessing infant cognitive development has aided educators in understanding the cognitive development of severely handicapped deaf-blind students in their classrooms. It is important for the teacher to know how a student is functioning cognitively so that goals for the student are set at an appropriate, achievable level. Activities designed by the teacher should require a response that the student is capable of providing. For example, it is a tremendous waste of both student and teacher time for a teacher to manipulate a student's hands into the formal sign for *bathroom* when the student is neither toilet-trained nor has any understanding of the concept. Because many deaf-blind students are functioning at such early intellectual levels, educators must understand levels of functioning that are normally associated with the development of infants. Toward this end, Piaget's theories of cognitive development are useful because they detail subtle increments in functioning even at the earliest developmental period: the first year of life.

Briefly, Piaget divided normal intellectual development into four major periods: sensorimotor (birth to 2 years), preoperational (2 to 7 years), concrete operational (7 to 11 years), and formal operational (11 years and older). The sensorimotor period is further described by a series of stages involving increasingly complex strategies for physical exploration and manipulation of the environment. These stages are characterized as follows.

1. *Reflexive (birth to 1 month)*: Behavior is primarily defined by reflexes, but slight modifications of reflexes occur as a result of early experiences.
2. *Primary circular reactions (1 to 4 months)*: When certain behaviors by chance lead to interesting effects, the infant attempts to recreate the effect through trial and error. If successful in coordinating the behavior and the effect, a new *habit* will result. The primary circular reaction is centered on the infant's body.
3. *Secondary circular reactions (4 to 10 months)*: Circular reactions (the re-creation of an interesting effect) now involve events or objects in the external world, away from the infant's body. The infant's primitive classifications are evident in the schemes habitually used to deal with particular objects or events.
4. *Coordination of secondary schemes (10 to 12 months)*: This stage marks the beginning of intentional or goal-directed behavior, as the infant uses different schemes in combination to achieve a desired event.
5. *Tertiary circular reactions (12 to 18 months)*: The search for novelty and interest in the properties of objects begins. Behavioral changes function to *produce* variations in environmental events, not merely to conserve or reproduce the events.
6. *Invention of new means through mental processes (18 months to 2 years)*: The child begins to use mental symbols and processes to free him or herself from the immediate concrete experience.

Complete examples of behavior in each substage can be found in Uzgiris and Hunt (1975).

There is evidence that individuals develop in the same sequence of stages as described by Piaget even when their development is so slow that it takes years to progress through a stage that might take one month in a normal infant (Cicchetti & Stroufe, 1976; Rogers, 1977; Wohlhueter & Sindberg, 1975; Woodward, 1959, 1963). There is also evidence (Kahn, 1976) that older severely mentally retarded students can be assessed using infant cognitive scales (Uzgiris & Hunt, for example) with highly reliable results. This is not to say that older deaf-blind students should be tested in a formal, standardized fashion using an infant assessment device; rather it points out the idea that deaf-blind students are still functioning at earlier developmental levels, and testing procedures must be aimed at those levels.

One of the most difficult problems in testing deaf-blind students is in eliciting the highest possible level of response from them. These students tend to respond in a very limited fashion, which often leads the test administrator to believe that no response at all was given. Many students are consequently thought to be functioning at a level lower than their actual stage of development. There is a need for the test administrator to be extremely observant of even the most subtle responses by the deaf-blind student. An eye blink, an opening of the mouth, a slight movement of an arm or leg, or a particular vocalization may all be consistent, overt responses that can very easily be overlooked. In fact, testing even with normal infants requires skilled observation. The work of Goldberg (1976) showed that knowledge of changes in the infant's heart rate gave the examiner information indicating that the infants were actually responding to stimuli that otherwise elicited no reaction. Thus, knowledge of a difficult-to-detect response (heart rate change) was crucial to the examiner's understanding of the infant's true abilities. The same principle holds for deaf-blind students. Examiners must find ways to observe and analyze even the most subtle responses.

The results of an assessment program conducted in Texas give further empirical confirmation of the idea that deaf-blind students can be assessed using the techniques and procedures that one might use for infants, and that their functioning can indeed be described within the system of stages defined by Piaget. Of the approximately 70 deaf-blind students (ages 3–18) seen in a two-year period, approximately 75% were functioning within the sensorimotor period. Most of the remaining students were functioning at the preoperational stage. There was an extremely wide variation in the type and degree of the visual and hearing impairments of the students; however, in no case was there a total and complete loss of both vision and hearing. It was therefore necessary to utilize one or both of these sensory channels during the assessment process.

Reflexive Level Responses

Some of the responses present in infants during the first month of life provide clues to the development of deaf-blind students' functioning at the reflexive stage of cognitive development. Visual fixation is a very commonly used response. Infants tend to look longer at novel stimuli; they tend to prefer large to small visual stimuli; and within the preferred size range, tend to prefer patterns in the order of horizontal to checkerboard to vertical (Slates & Sykes, 1977). The further children develop, the less they will demonstrate these preferences. Thus, students with otherwise intact vision who demonstrate no preference, or who prefer small vertical patterns, may be functioning beyond the reflexive level. At the very least, this functioning would suggest developing visual acuity. On the other hand, large horizontal patterns may be used to elicit visual fixation from low-functioning students whose vision is completely intact.

A second very commonly used infant response is heart rate. This is utilized in many studies involving auditory stimuli, but can be monitored with visual stimuli as well. A deceleration in heart rate indicates an orienting response (i.e., one that is adaptive) and that means the infant is attending to the stimulus. An acceleration in heart rate indicates a defensive response, a preparation for "fight or flight," which is basically nonadaptive in an educational situation. The work of Bradley-Johnson and Travers (1979) indicates that these same responses are also present in adults.

Habituation to startling stimuli is a general adaptive response in infants. Dr. T. Berry Brazelton (Note 1) suggests that infants are functioning well if they habituate to an auditory or visual stimulus within five trials. This response indicates that children are able to understand or process the stimulus to the point where they realize it is not a danger to them and so will begin to attend to other stimuli in the environment. The implication for education of deaf-blind students is that habituation to stimuli should be viewed as a positive response. Teachers should not expect students to respond to the same stimulus or perform the same activity over and over.

Some research has shown that infants can use reflexive patterns to control the environment. Here practical application of research proves helpful throughout the assessment process for students functioning at a reflexive stage. Butterfield (1968) demonstrated that one-day-old infants could control the onset and cessation of music through a rudimentary sucking reflex. The infants were actually controlling a reflex action in order to control the auditory environment. This research demonstrates the importance of the auditory channel and its relationship to cognition even at this early stage of development. If deaf-blind students functioning at the reflexive level are able to demonstrate control of a reflexive behavior, the indication would be that they are beginning to exert some measure of control over their environment.

One variable that must be considered in the utilization of auditory indicators of cognitive development is that of level of response. Northern and Downs (1974) and Ewing and Ewing (1944) demonstrated that infants are selective as to the type and intensity of auditory signal to which they will respond. Their research found that noisemakers required an energy level of 50–70 dB to get a response from the neonate, while vocal energy of only 40–60 dB was required for the same level of response. The most dramatic difference between energy levels is achieved at the substage of coordination of secondary schemes and is carried through the tertiary circular substage. Here, a 25–30 dB level is required to obtain a response using noisemakers, while a vocal sound only requires 5 dB. The implications appear obvious—throughout the entire sensorimotor period, voice has a much higher arousal value than noisemakers. During the assessment process, the examiner's, mother's, or teacher's voice should be used in attempting to elicit responses from deaf-blind students because they will respond much more readily to voices than to the whole kit of cymbals, bells, and gongs.

Imitation is an area that is always assessed when observing a deaf-blind student in the sensorimotor period. Meltzoff and Moore (1977) showed us that infants begin to visually imitate at 12 to 21 days of age. Observations of neonates show us that they

"Children who habituate quickly to stimuli are likely to develop cognitive skills faster and to a higher degree than those who habituate slowly."

also imitate vocalizations within the first few hours of life. A visit to any neonatal nursery will substantiate the fact that infants, from birth, exhibit basic imitative auditory behavior called contagion. Contagion is the production of vocal sound in response to a preceding perceived vocal stimulus; thus when one infant cries, many more can be expected to join in on the chorus. The infant, in time, becomes more sophisticated in the level of response and the result is a verbal interchange between infant and caregiver. Vocal contagion then can be viewed as a precursor to more sophisticated levels of verbal imitation. For the child who is still functioning on a reflexive level, demonstration of contagion behavior is an important indicator for future sensorimotor development. Many deaf-blind children at this level will demonstrate contagion when the examiner repeats a sound that the child has been making (cooing, wailing, or whatever), entering into a sort of conversation of sounds between the child and examiner.

Cross Modal/Intermodal Channel

How the deaf-blind student utilizes vision and hearing in concert also provides information pertinent to the assessment of sensorimotor development. The most popular example of the coordination of vision and hearing can be found in the overt localization of an infant to a sound source. It had been shown that overt sound localization in the human infant did not occur until around the sixth month of life (Chun, Pawsat, and Forster, 1960; Ewing and Ewing, 1944; Lyons-Ruth, 1975). Current and not-so-current research indicates that the coordination of the visual and auditory senses occurs much earlier, at a reflexive level. Newborn infants were found to localize to a sound source. This reflexive sound searching is known as the oculogyric reflex and is manifested by visual tracking *toward* a soft lateral sound source and *away from* a loud lateral sound source (DeJong, 1950; Mendelson & Haith, 1976; Wertheimer, 1962). Brazelton also demonstrated more overt lateral localization of one-day-old infants to their mothers' voices.

Primary Circular Reactions

Visual Channel

Children functioning at this stage respond to visual novelty by selectively fixating on and attending to an unfamiliar stimulus longer than to a familiar stimulus. Memory seems to play an important part at this stage. A study by DeLoache (1976) showed that when children are presented with a certain visual stimulus (A), followed by a different stimulus (B), followed by the re-presentation of the original stimulus (A), they treat the third presentation as a novel stimulus—as if they have never seen it before. This suggests that the presentation of the second stimulus produces a competing memory model for the child, who does not realize that the third presentation is the same as the first.

Studies of children's habituation to visual stimuli have also produced some interesting results. DeLoache (1976) also found that in working with children at the primary circular reactions stage, two distinct groups were formed. One group habituated quickly to the visual stimulus (in 8 trials or less) and another distinct group habituated slowly (in 11 trials or more). This work points out the fact that there are indeed distinct classifications in children's ability to process and habituate to visual stimuli. As will be noted in the next section, the same phenomenon occurs with auditory stimuli. The significance of this fact is that other research (Miller, Sinnott, Short, & Hains, 1976) links speed of habituation to development of object permanence 10 months later; that is, faster habituators developed a higher level of object permanence than did slower habituators. Carrying this idea one step further, Wachs (1975) found a significant correlation between performance on the object permanence subscale of the Uzgiris-Hunt with later performance on the Stanford-Binet intelligence test. What this seems to mean is that children who habituate quickly to stimuli are likely to develop cognitive skills faster and to a higher degree than those who habituate slowly. Does this mean that educators should try to train children to habituate more quickly? The answer is unknown; the research to this point is correlational not causative, and it is not at all clear that habituation is a skill that can be taught. It is clear, nonetheless, that habituation time is a factor which should be observed during the assessment of severely handicapped deaf-blind students.

Auditory Channel

As noted earlier, the research in auditory habituation shows that children who are slow habituators also have trouble processing auditory information. In a study by Chang and Trehub (1977), infants who were fast habituators responded to auditory patterns (melodies) as a whole; that is, after they had heard a melody they responded to the same melody played at a higher pitch as though it were a familiar stimulus. If the same notes were played in a different order, the infants responded as to a novel stimulus. This indicates that the infants processed the entire melody as a whole, not just by relating to one note at a time. The slow habituators, however, did not process sound in a holistic way; they responded to both the scrambled melody and the original melody played at a higher pitch as novel stimuli. This means that they paid attention to only one feature, the pitch of the first note. The faster habituators were able to comprehend the melody as an auditory unit.

Regardless of habituation time, all infants at this stage continue to respond more readily to human vocalizations than to nonspeech sounds. In fact, McCaffrey (1971) noted that infants even discriminated vowels and consonants, as evidenced by a heart rate change to a corresponding change from perceived vowels and consonants. Further infant discriminatory abilities were demonstrated by Turner (1971), who found that infants functioning in the primary circular reactions substage were able to discriminate their mother's voice from other voices, even when the mother's voice was filtered by removing selected frequencies from the speech signal. If the parents of a deaf-blind child are available during the assessment, their help can be enlisted to see if the deaf-blind child will respond to a parent's voice when another person is talking or when several people are talking.

Cross Modal/Intermodal Channel

The coordination of vision and hearing in this stage has been demonstrated in a very intriguing way. Lyons-Ruth (1974,1975) found that infants 4 months of age would look away from an object making an incongruous sound. This demonstrates knowledge of objects as well as their auditory components. The student who is capable of this phenomenon has moved beyond the sound-object pairing found during the reflexive stage to a deeper understanding of objects and their attributes.

A related study demonstrated auditory-spatial relationship abilities of infants. When the infant's mother was positioned in front of the subject with her voice being projected from laterally arranged speakers, the infant showed no distress over the disparity of space (McGurk & Lewis, 1974). However, when an object and its sound were used in place of the mother, then the disparity of object and sound was too much for the infant, who responded by making random arm and leg movements. When the sound was relocated to be spatially consistent with the object, the infant quieted (Lyons-Ruth, 1974, 1975). The implications here for assessment of spatial relations using auditory/visual channels are easily understood. The auditory sense, when used intelligently, provides the student with an array of spatial and object-oriented information.

Secondary Circular Reactions

Responses

Both visual and auditory channel research make use of fixating and/or orienting to the stimulus as responses indicative of attention to and discrimination of the stimulus presented. However, studies by both Goldberg (1976) and Kinney and Kagan (1976) indicate that monitoring of the heart rate will produce more consistent and reliable responses. In fact, Goldberg's cardiac data show the children operating on a more sophisticated level than their visual behavior would indicate. This has tremendous implications for assessment of severely handicapped deaf-blind students whose responses are often limited or confounded by motor handicaps. If methods of utilizing cardiac responses can be found for educators, they will gain more accurate information on the child's developmental level, which will result in better insights into assessment and teaching techniques.

Visual Channel

At this stage, children's visual memory has achieved a significant step in development. Goldberg (1976) reports that children are able to form a mental image of an object presented visually and hold it in memory through the intervening variable of a screen. Thus, if children at this stage see a favorite toy disappear behind a screen, then reappear at the end of the screen, they do *not* respond to it as if it were an unfamiliar stimulus (the way a child functioning at the primary circular reaction level would). However, children at this stage are still not able to predict visual events; that is, they do not expect the same object that went behind the screen to emerge from the screen. They respond only to whether or not this second object is a familiar or unfamiliar one. The development of event-predicting ability is a precursor to the development of object permanence. As will be noted, event prediction and the subsequent development of object permanence are the province of children functioning at the next stage.

Children functioning at the secondary circular reactions stage do have some fairly sophisticated visual abilities. Rose (1977) has studied the infant's ability to perceive changes in the dimensionality of visual stimuli. The infants at this stage can tell that a *picture* of a three-dimensional pattern is the same as the pattern itself; thus recognizing the distinctive features of an object whether in two or three dimensions. These results cannot be adapted wholesale to the free interchange of real objects and pictures of objects in the classroom because the patterns used in the study were non-objects and were very carefully photographed so that the two-

"Information from experience of an object in one mode is carried over to another mode."

and three-dimensional patterns looked the same. However, there is an implication here in terms of early training for children who are candidates for communication boards. Even at this very early stage of development, the deaf-blind child may be able to relate the (more symbolic) picture of an object on the communication board with the corresponding object itself.

Auditory Channel

Students within this substage are beginning to master auditory space. When a sound is made in a vertical plane, they take an indirect route in locating the object. Localization on a vertical plane then is demonstrated first to the side, then up or down to the object.

Deaf-blind students also demonstrate this indirect sound localization pattern. They first look to the left or right and then look up or down to locate the sound source. Deaf-blind students who demonstrate clear horizontal, then vertical search patterns tend to be functioning at a slightly lower level than those who are beginning to demonstrate a more direct, oblique search pattern.

Cross Modal/Intermodal Channel

The reader by now has noted that the tactile sense has received little attention. This is not to imply that tactile experience is not worth investigating during the assessment process. On the contrary, when tactile experience is combined with visual experience, the result is an intermodal indicator of object concept as well as a demonstration of object schema. When students functioning within this stage are presented with an object (out of view) to tactually explore and are then presented visually with the explored object and a novel object, the students consistently fixate on the novel object. The tactually explored object is treated as a familiar object by the students even though they have not seen it. Information from experience of an object in one mode is thus carried over to another mode (Gottfried, Rose, & Bridges, 1977).

Coordination of Secondary Schemes

Visual Channel

At this stage, the concept of the permanence of objects is becoming increasingly firmly established, as indicated by the children's ability to predict events. If children watch a favorite toy disappear behind a screen and a different toy appears at the other side, there will be distress at this appearance because of the expectation that the original toy would reappear (prediction of an event). An even further development of object permanence would be indicated if, upon the emergence of the unexpected toy, the children began to search for the original toy they expected to appear.

Auditory Channel

During this stage, the ability to utilize the auditory signal for information is similarly becoming more refined and its relationship to objects more established. Students are now able to locate a sound source in a vertical plane and to fixate directly on the object without the searching behavior demonstrated in the previous stages. The student has mastered immediate auditory space on all planes.

Sound and its relationship to objects becomes increasingly important in the development of certain concepts. During this stage, sound can be used as an indicator that an object which has been hidden from view still exists. Freedman, Fox-Kolenda, Margileth, and Miller (1969) demonstrated that a child will search for an object that has been hidden from view if the object continues to make the noise which has been associated with it. Sound then moves from the status of being a simple attribute of the object to being conceptualized as a symbol for the object. If deaf-blind children can demonstrate this ability to search for hidden objects that continue to make noise, the implication is that they are ready for a more symbolic method of communication. Depending on the child's particular auditory capabilities, this may mean speech, sign, or communication board; but it does signal the beginning of the child's ability to deal with symbols at least on a primitive level.

Cross Modal/Intermodal Channel

An indication of cognitive, intermodal development during this stage involves the modes of communication that a student employs expressively. Harding and Golinkoff (1979) found that children functioning at the stage known as coordination of secondary schemes combine modes of communication to express needs, desires, and wants. Children functioning at previous stages tend to use only one mode at a time for communication purposes. Likewise, as deaf-blind students gain control and awareness of the perceptual experiences that confront them, they will begin to utilize a variety of communicative behaviors to overcome the perceptual limits that they experienced during earlier stages. Deaf-blind students functioning at this stage were observed to point, reach out, and vocalize all at the same time for a desired object, whereas at an earlier stage they would only have vocalized.

Summary

Deaf-blind students functioning in the sensorimotor period demonstrate a variety of behaviors which, if accurately observed, can indicate levels of functioning and form the basis for

> "If we as educators are to understand how these students experience their world, we must be skillful in examining every avenue of input and every resultant behavior."

programming (see Table 1). The distance senses, vision and hearing, are the senses that assist the students in reaching out beyond themselves to the environment. Although these senses are impaired in deaf-blind students, there is typically some level of functioning in either one or both channels that will greatly support the student's overall adaptation and cognitive development. If we as educators are to understand how these students experience their world, we must be skillful in examining every avenue of input and every resultant behavior.

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Table 1
Cognitive Indicators

	Areas of Assessment						
Stages of Development	Perceptual	Visual Pursuit and Localization Object Permanence	Means-Ends	Causality	Schemes	Spatial Relations	Imitation
Reflexive	Noisemakers 50-70 db Voice 40-60 db Heart rate change to change in speech sounds Visual pattern preferences	Localizes to Voice (laterally) Oculogyric reflex Habituation to noise within 5 trials	Can use reflexive motor patterns to initiate auditory event				Vocal contagion
Primary Circular	Level of Response: Noisemakers 50-60 db Voice 47 db Visual habituation: 8− fast 11+ slow	Localize to lateral sound source Visual Habituation: 8− fast 11+ slow Responds to visual novelty		Discriminates mother's voice from other voices	Will look away from objects making an incongruous sound	No distress over visual/auditory incongruity involving mothers	
Secondary Circular	Noisemakers 30-40 db Voice 15 db Changes in dimensionality easily detected Visual/tactile cross modal transfer	Responds to visual novelty but no event prediction Localizes to sound to side then down			Tactile/visual cross modal transfer	Localizes to sound to side then down Changes in dimensionality can be detected as readily as changes in patterns	
Coordination of Secondary Schemes	Level of Response: Noisemakers 25-35 db Voice 5 db	Localizes sound directly down Sound indicates object still exists (more than an attribute)		Children use a combination of modes for intentional communication		Localizes sound directly down (command of auditory space)	
Tertiary Circular	Level of Response: Noisemakers 25-30 db Voice 5 db						
Invention							

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A Three-Year Study of Behavioral Change in Deaf-Blind Children

W. Scott Curtis

When the rubella epidemic of the early 1960s struck, it produced a large population of deaf-blind children for whom the educational system was unprepared. Until that time, deaf-blind children had been educationally managed in a small number of programs such as those at the Alabama Institute for the Deaf and Blind and the Perkins School for the Blind. Evaluations of this small group often were carried out through the assistance of the American Foundation for the Blind by educational and medical teams in centers such as Syracuse University Center for the Development of Blind Children, Johns Hopkins University, and the Central Institute for the Deaf. The reporting of data on the progress of these children was disseminated most often as case studies on specific individuals, of whom Helen Keller is the most notable example. Group research data was negligible at that time. The large number of children in this diagnostic category who required services by 1965 necessitated great changes in the number and location of suitable agencies throughout the U.S. The Regional Center System, which was developed by the U.S. Office of Education, was a model, rapid service-delivery system used to mobilize a nationwide response to this educational crisis.

Attendant upon any such service-delivery system is the ultimate need to assess the progress of the children it serves. The following report is concerned with the evaluation of progress of a group of deaf-blind children who entered this new service-delivery system. Since the children were largely below the level of tests available for psychometric measurement, a three-year study was first undertaken to develop a suitable measurement tool. The Telediagnostic Protocol for behavioral observation was developed with support from the U. S. Office of Education. The report describes a three-year progress evaluation of 49 deaf-blind children in 18 of the regional centers.

Procedure

The methodology involved making a visit to each center at the same time each year and producing a 24-minute videotape of each child in specific life situations. The videotapes were viewed then by experienced professional staff who used a list of attributes selected for the testing protocol to rate each child. The children were videotaped in eight situations, and ratings were grouped into three behavioral domains: communication, adjustment, and learning.

Subjects

Subjects were selected with the aid of representatives of the Deaf-Blind Regional Centers and staff of the deaf-blind programs. Regional center representatives met as a group with the authors to review the test, the objectives, and the research population needs, and to recommend appropriate facilities in their regions. The center staff selected the children for the study. Criteria for inclusion in the study sample were as follows:

1. The children were in a diagnostic or educational program at a facility recommended by representatives of the Deaf-Blind Regional Center staff.
2. The children were already placed in a program for deaf-blind children, *or* were undergoing evaluation for such placement.
3. The children were judged by the center staff to be more typical than atypical of the deaf-blind population the same age at their facility.
4. The children were between the ages of 3 and 8 years at the time of the first videotaping.
5. The children were in the first three years of diagnostic treatment or observation at the facility at the time of the first videotaping.
6. The children were motorically mobile and healthy enough so that their future placement would be determined by educational rather than medical criteria.
7. The children were likely to be available throughout the three-year study period regardless of relocations.

Observational Situations

Specifically, eight videotape-recorded segments of three minutes in length were taken of the child in the course of the day. The segments included:

1. *An unstructured situation* showing how the child performed when left alone without stimulation in a relatively unfamiliar room;
2. *A task orientation* showing the child working at a task such as block-stacking, bead-stringing, puzzle-making or a higher level psychoeducational task;
3. *A stimulus orientation* in which the child was subjected to stimuli in all sensory avenues; i.e., auditory, gustatory, tactile, visual, olfactory, etc.;
4. *An interpersonal orientation* in which the child was shown closely interacting with an adult without the intervention of materials or toys;
5. *A mealtime situation* usually showing the child at lunch with peers;
6. *A self-care skills* session in which the child was shown at a common daily task such as toileting, dressing, bathing;

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7. *A formal classroom situation* in which the child was shown at play with peers.

These observational settings had been selected during the earlier test development procedure. Data from this project furthered the statistical analysis and development of the test procedure.

Rating Forms

Two forms had been developed to evaluate children in the eight situations. A behavioral observation form was scored for each of the eight scenes. The eight scores were averaged for the data reported. A summary rating form then was completed by the judges, based on their overall reaction to the child's performance.

Judges

The videotaped samples were judged by three of six professionals experienced with the education and/or evaluation of deaf-blind children. Their backgrounds included special education, social work, speech pathology and audiology.

Judgment Procedures

After the videotaped samples were collected on all children for each year, they were assembled through tape dubbing so that each taped scene for each child was presented in the same order to all judges. Three judges viewed and rated each tape of the sample. The order in which each judge viewed the subjects was different. Additionally, approximately 50% of the subjects were viewed in only one year by a given judge. Of the 50% viewed by a judge, 27% were viewed during two alternate years and 23% during two consecutive years.

Results

Data and statistical tests relevant to the test procedure included mean scores, analysis of variance for the means, and Duncan Multiple Range Tests of Homogeneity for significantly different means for the three behavioral domains. Identical data are presented for the Summary Rating Form in terms of the three behavioral domains. Tables 1 and 2 show mean scores from the Behavior Rating Form and the Summary Rating Form for each behavioral domain for each year. In general, the group results indicate that the subjects tended to remain the same in each domain or to progress slightly, but within the same general rank, on both the mean for the eight situations of the Behavior Rating Form and the Summary Rating Form scores over the three-year period.

Table 1
Mean Judged Score for Each Behavioral Domain on the *Behavior Rating Form* for All Situations for Each Year

Domain[a]	Score		
	Year		
	1	2	3
Communication	2.27	2.37	2.40
Adjustment	1.84	1.89	2.03
Learning	1.28	1.28	1.41

[a] Score ranges are not identical for each domain. They are 0-5 for Communication, 0-4 for Adjustment, and 0-4 for Learning.

Table 2
Mean Judged Score for Each Behavioral Domain on the *Summary Rating Form* for All Situations for Each Year

Domain[a]	Score		
	Year		
	1	2	3
Communication	1.76	2.17	1.92
Adjustment	1.73	1.75	1.56
Learning	3.15	2.15	2.66

[a] Score ranges are not identical for each domain. They are 0-5 for Communication, 0-4 for Adjustment, and 0-5 for Learning.

One-way analysis of variance combining all situation scores and comparing means across the three-year period were significant for each domain beyond the .01 level.

The Duncan Multiple Range Test of Homogeneity was used to display mean differences for the group data over the three-year period for each domain on the Behavior Rating Form. These means are reported in Table 3. The communication mean scores increased between the first and second testing but held constant for the third year of testing. On the other hand, the mean scores for adjustment and learning remained constant for the first two test administrations but showed a statistically significant rise for the third test year.

One-way analyses of variance scores comparing means over the three-year period on the Summary Rating Form for each domain, as in the case of the Behavior Rating Form, were statistically significant for each behavioral domain.

"Over the two-year time span . . . communication, adjustment, and learning behaviors improved. . . ."

Table 3
Duncan Multiple Range Homogeneity of Means for Each Year for the *Behavior Rating Form*

Behavioral Domain	Year	Mean[a]
Communication	1	2.27*
	2	2.37 *
	3	2.40 *
Adjustment	1	1.84*
	2	1.89*
	3	2.03 *
Learning	1	1.28*
	2	1.28*
	3	1.41 *

[a]Any two or more means that have asterisks in the same vertical line are not significantly different.

Table 4 reports the Duncan Multiple Range results for domain means. These results differ in configuration over the three-year period from those of the Behavior Rating Form. Communication scores were not significantly higher on the second test year. Adjustment mean scores were not significantly different the first two years of testing, but they decreased the third year. The learning mean scores increased consistently and significantly with each test administration.

Discussion

The children changed. The changes were small but still statistically significant. Over the two-year time span of the three administrations of the evaluation procedures, communication, adjustment, and learning behaviors improved when judged in the eight situations and averaged on the Behavioral Observations Rating Form. The children also showed change, in the view of the judges, on the items of the Summary Rating Form. However, communication was found to be unchanged and adjustment and learning to have deteriorated over the two-year period.

Forty-two specific judgments are required on the Behavior Rating Form and 25 are required on the Summary Rating Form. Comparing the first with the third administration of the test and looking only at the highest rateable score (satisfactory, asset, etc.) for each of the 67 items of the two scales, the judges reported no change of as much as 10%. Nine changes of between 5% and 10% occurred in a positive direction and seven changes of 5% to 10% occurred in a negative direction. Behavior scores showed improvement in purposefulness, independence, persistence, gross coordination, eye-hand coordination, and sensory discrimination. Cooperativeness, manageability, and reaction to punishment and reward decreased by 5% to 10%.

On the Summary Rating Form, within the highest category of achievement for each item, two behaviors improved by 5% to 10% over the test period: (a) the amount of learning shown during activities of daily living, and (b) the ability to learn in unstructured social situations. Three behaviors were judged to diminish by 5% to 10%: (a) the amount of minimal supervision required during eating, (b) toileting, and (c) playing in groups.

Although these results can be analyzed in much greater detail (in fact, down to individual differences over the test period for each item), those presented here offer the reader basic data for thoughtful program monitoring and research planning.

The Behavior Rating Form and Summary Rating Form differ slightly in an important way. The former asks the observer to make more judgments about the abstract components of the child's behavioral sys-

Table 4
Duncan Multiple Range Homogeneity of Means for Each Year for the *Summary Rating Form*

Behavioral Domain	Year	Mean[a]
Communication	1	1.76*
	2	2.17 *
	3	1.92*
Adjustment	1	1.73 *
	2	1.76 *
	3	1.56*
Learning	1	3.15*
	2	2.15 *
	3	2.66 *

[a]Any two or more means that have asterisks in the same vertical line are not significantly different.

tem (auditory reception, curiosity, etc.), while the latter inquires into more specific areas of behavior that relate to management and placement (Braille writing, dressing, etc.). The changes reported for the children studied on the Behavior Rating Form are not the same as those found on the Summary Rating Form, perhaps due to the more practical orientation of the latter. It is also possible that the difference is due to variation in judgmental task for the two forms. In the behavioral observation ratings, the judge makes eight independent and very specific judgments which later are averaged objectively. In this case, the children were judged to have improved over time. In the summary ratings, the judge estimates his or her own average, a more subjective rating. In this case, the children did not change.

A third possibility exists. It is quite possible that the skills judged on the behavior rating form did improve to a statistically significant degree but because of the small degree of improvement, they did not produce changes which would alter the overall management of the child in terms of the specifics of case management of the summary ratings.

The complexity of these evaluations should reinforce the idea that simple decisions about a child's placement or his or her progress cannot be made. Furthermore, judgments about the effectiveness of a program in terms of the children's progress is not a simple matter. The most reassuring thought coming from these results would seem to be that it is possible to produce an assessment instrument that will measure change of the very small amounts one might expect from this population. The challenge to service-delivery programs remains to increase the number of areas and the degree of children's progress. In addition, programs must be able to document those pedagogical methods which produce the progress.

Finally, the finding that so many skills improved must be interpreted as a positive achievement of the service system. The fact that the children required more supervision, were seen as no better off communicatively, and were judged to have a lower level of adjustment and learning must be seen as a negative finding. One is inclined to believe we may be winning the battles and losing the war. That is, the children are learning in demonstrably measurable degrees, but the things they are learning and the degree to which these things are learned seem to be insufficient to slow the deterioration of overall subjective views of the children as they age.

Training for Life: A Living and Work Program for Deaf-Blind Youth

Susan M. Descarage

What does the future hold for a deaf-blind multihandicapped individual upon completion of an educational program at age 21? The answer to this question is dependent upon numerous factors, but one response prevails. A large number of deaf-blind individuals are leaving highly specialized educational programs and entering a world for which they have been inadequately prepared. This may be attributed to the failure of programs to objectively assess the individual, design appropriate instructional programs, and establish and strive toward lifelong goals. Life programming must commence at the onset of educational programming to prepare an individual for his or her optimum level of functioning in the post-school environment. Failure to recognize and institute appropriate programs increases the likelihood of institutionalization and dependence.

Throughout the history of deaf-blind education, schools primarily have geared their programs toward serving the high-functioning deaf-blind population and have overlooked the needs of the middle- to low-functioning student. It had been theorized that the majority of deaf-blind children could lead independent lives as a direct result of educational intervention strategies. Experience and the passage of time have proven otherwise. Due to the identification of increasing numbers of middle- to low-functioning students now reaching adolescence, the need for services for these individuals is immediate. These students must acquire the requisites needed to function in a post-school living and work environment.

The Helen Keller School of Alabama has recognized this problem and seen the need for an immediate reorganization of the present educational program. This school was recently the recipient of a three-year federal grant to implement a model vocational program. This model was specifically designed to address the educational, social, and vocational needs of the middle- to low-functioning deaf-blind population. Acquisition of four additional staff members (Living and Work Coordinator, Prevocational Workshop Coordinator, Placement and Work Experience Coordinator, and Secretary) was required for development and implementation of the model program.

Rationale of Program

Serving students in a residential school setting between the ages of 5 and 21 necessitates that schools educate deaf-blind children in all aspects of life during their most formative years. In previous years, educational programs have been geared toward serving high-functioning deaf-blind students. For prevocational purposes, high-functioning deaf-blind students are identified by their performance levels in specified skill areas. These areas include fine and gross motor movements, communication, mobility, behavior, and other work-related skills. If a deaf-blind student has the capability to attain these performance objectives, he or she should be considered high functioning (i.e., capable of sheltered employment and possible competitive employment in the future). The Helen Keller School was unprepared to meet the educational needs of the influx of deaf-blind children. These children had not developed the prerequisite skills needed to benefit from prevocational/living education, yet they had reached a plateau in their classroom instruction. The need for change was clearly evident and long overdue.

Program Participants

Forty-six deaf-blind children and youth, ages 5 to 21, from a seven-state area (Alabama, Mississippi, Florida, Kentucky, Tennessee, Louisiana, and Virginia) are presently receiving a free appropriate public education (as mandated by PL 91-230, PL 89-313, and other federal, state, and local directives) at the Helen Keller School of Alabama.

As stated in the *Federal Register*, deaf-blind children are defined as

> Children who have auditory and visual handicaps, the combination of which causes such severe communication and other developmental and educational problems, that they cannot properly be accommodated in special education programs solely for the hearing handicapped child or for the visually handicapped child. (20 U.S.C. 1422; 45 CFR 121 c. 37 (a))

Thirty of these children are between the ages of 13 and 21. Their needs exceed the services presently being provided by the educational program. Emphasis must be placed upon services geared to prepare them for the post-school environment.

Sequential Tracks for Living and Work

The Sequential Tracks for Living and Work Chart (Figure 1) provides an overview of the innovative vocational model used at the Helen Keller School. The school enrollment has been classified into two major groups: middle- to low-functioning deaf-blind, and high-functioning deaf-blind students. The program for each group is composed of two tracks: educational/vocational track and living track.

Medical and Educational Assessment

Upon referral to our school program, each child receives a thorough medical and educational assessment. The assessment procedure includes diagnosis and evaluation in the areas of ophthalmology, audiology, psy-

> "Provisions are made for these youngsters to move to dormitories for older boys and girls when they become semi-independent. . . ."

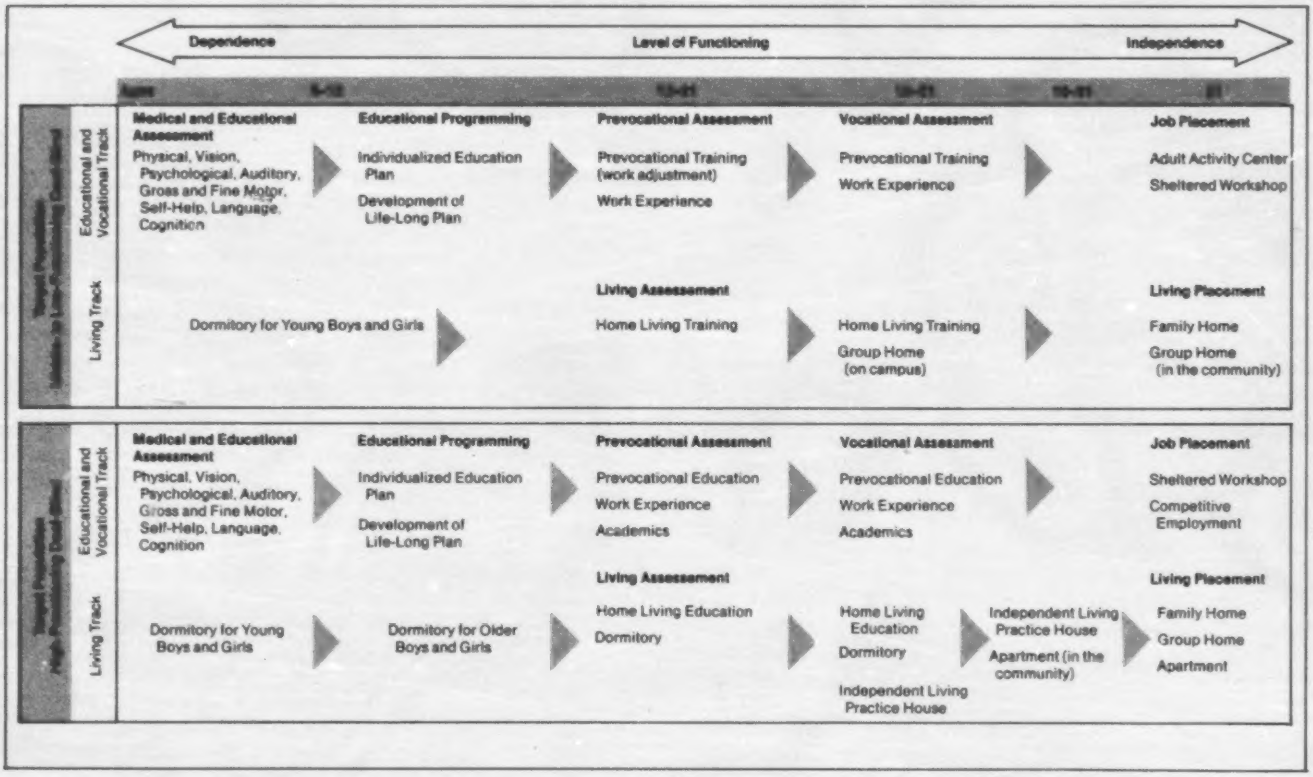
chology, medicine, dentistry, education (gross/fine motor, speech and language, self-help, cognition), living, and social work. The medical and educational assessment usually extends over a period of four days. Most of the students referred to the program are between the ages of 5 and 12. A summary conference is then held to report the findings in each discipline and to make recommendations. Preparations, prior to the child's placement, ensure a smooth transition into the program. An individualized educational plan is developed in accordance with the child's strengths, weaknesses, and needs. During the child's educational program, intensive training is provided in a normal developmental sequence.

Students between the ages of 5 and and 12 are housed in dormitories designated for young boys and girls according to their level of development of social and self-help skills. Provisions are made for these youngsters to move to dormitories for older boys and girls when they become semi-independent in these areas. It is theorized that only the high-functioning students of this age group will advance to this degree.

At age 13 all students, regardless of level and/or dormitory placement, receive an intensive two-day prevocational and living assessment by the prevocational and living instructors (project staff). Determination as to functioning level is based upon this assessment, and the student is assigned to the appropriate tracks.

Life-Long Plan

An essential component of the program is the generation of a life-long



Dependence
Level of Functioning
Independence
Ages
5-12
13-21
18-21
19-21
21
Target Population
Educational and Vocational Track
Medical and Educational Assessment
Physical, Vision, Psychological, Auditory, Gross and Fine Motor, Self-Help, Language, Cognition
Educational Programming
Individualized Education Plan
Development of Life-Long Plan
Prevocational Assessment
Prevocational Training (work adjustment)
Work Experience
Vocational Assessment
Prevocational Training
Work Experience
Job Placement
Adult Activity Center
Sheltered Workshop
Living Track
Dormitory for Young Boys and Girls
Living Assessment
Home Living Training
Home Living Training
Group Home (on campus)
Living Placement
Family Home
Group Home (in the community)
Target Population
High-Functioning Deaf-Blind
Educational and Vocational Track
Medical and Educational Assessment
Physical, Vision, Psychological, Auditory, Gross and Fine Motor, Self-Help, Language, Cognition
Educational Programming
Individualized Education Plan
Development of Life-Long Plan
Prevocational Assessment
Prevocational Education
Work Experience
Academics
Vocational Assessment
Prevocational Education
Work Experience
Academics
Job Placement
Sheltered Workshop
Competitive Employment
Living Track
Dormitory for Young Boys and Girls
Dormitory for Older Boys and Girls
Living Assessment
Home Living Education
Dormitory
Home Living Education
Dormitory
Independent Living Practice House
Independent Living Practice House
Apartment (in the community)
Living Placement
Family Home
Group Home
Apartment

Figure 1
Helen Keller School of Alabama
Sequential Tracks for Living and Work Chart

> **"The LLP looks forward in time and includes the post-school environment and placement opportunities in both living and work."**

plan to ensure continuity in each student's program. The purpose of a life-long plan (LLP), as conceptualized by the Alabama Institute for Deaf and Blind, is not to expand opportunities for the deaf-blind, but rather to sustain services beyond age 21. According to Public Law 94-142, an Individualized Educational Plan (IEP) is required for each child; it must be updated and/or revised yearly. However, this plan is short term in nature. At age 21 the student leaves the educational program and no longer has a guide or plan to follow. A life-long plan transcends the period from its conception (when first written) until the death of the individual. Provisions are made to update and/or alter it at any point in time, but it must be reviewed at least every two years by the agency currently serving the individual. It is, in essence, a long-term goal composed of many short-term objectives (individualized educational plans). The LLP looks forward in time and includes the post-school environment and placement opportunities in both living and work. This plan fosters communication among various agencies and ensures consistency in the instructional program.

Prevocational and Living Assessment

Each student receives an intensive two-day prevocational and living assessment performed by the project staff prior to assignment to the appropriate sequential living and work tracks. This intensive two-day assessment is administered again at the start of the second and third project years. In addition, at age 16, each student is referred to Vocational Rehabilitation Services for a thorough evaluation to determine specific vocational aptitude and abilities. At present, there are no standarized diagnostic instruments designed to adequately assess these students in all areas of living and work. The project staff is currently developing a comprehensive assessment instrument and curriculum guide utilizing information gathered from implementation of this program; it will be available for dissemination upon completion of the third year of the project. In devising this assessment instrument and in providing initial and reassessments, the following assessment guides are being utilized:

1. Prevocational Assessment and Curriculum Guide
2. An Education Training Guide to Prevocational Skills for Deaf-Blind Persons
3. American Association of Mental Deficiency Behavior Scale
4. Cain-Levine Social Competency Scale
5. Balthazar Scales of Adaptive Behavior
6. Pennsylvania Bi-Manual Work-sample
7. Minnesota Rate of Manipulation Tests
8. Bennett Hand-Tool Dexterity Test
9. Brigance Inventory of Essential Skills
10. Perkins Curriculum for Daily Living Guide
11. AAMD-Becker Reading-Free Vocational Interest Inventory

A complete and accurate assessment of the student's skills and abilities is achieved through the utilization of several diagnostic instruments. Formal and informal observations supplement the information obtained from these tools. Based upon this initial two-day prevocational assessment, the student's program is designed to raise his or her present level of functioning toward achievement of the requisities needed to live and work. The instructional ratio is one teacher to every three or four students. A student's progress is measured through the maintenance of daily logs, behavior charts, time studies, and data-based assessment sheets for the work samples and daily living activities.

Work Adjustment

The middle- to low-functioning deaf-blind students receive prevocational training in the area of work adjustment. The work adjustment center is comprised of approximately 40 work samples, each designed to teach and evaluate a specific skill. These work samples are developmental in nature. They range from simple to complex at each level and are task-analyzed according to individual student needs. Basic prevocational skills included are simple assembly tasks (small nut and bolt assembly, large nut and bolt assembly, packaging items, assembling multiple piece objects—five or less), discrimination and classification tasks (reproducing patterns, colors, shapes, sizes, matching object to object), and complex assembly tasks (assembly of multiple piece objects—six or more, two- and three-person assembly line tasks). Emphasis is placed upon the development of gross and fine motor skills, e.g., grasping, releasing, turning, pulling, pushing, putting into, putting on, taking out, taking off, lifting, carrying, using two hands together, lifting arm overhead. Individualized instruction by a teacher or an aide is provided for at least three hours per day. A minimum of 35–50% success rate with less than 5% error is required to move to a higher level and/or the next work sample. Data assessment sheets are designed to accompany each work sample. The assessment sheets ask for the following information: description of task; number of trials/dates; instructional, physical, gestural/ verbal prompts required; number of errors and time of each trial; skills

"Time management is also an important component of this program."

required for task; and a task analysis of the work sample itself. In addition to the data collection sheets, all materials needed to test and/or instruct the students are included in each work sample. The data collection sheets are individualized yet also can be utilized as a profile of the effectiveness of the intervention techniques employed.

In conjunction with teaching these specific skills, there is concurrent instruction in a number of related areas. These include, but are not limited to, attending to task, sustaining work effort, working for delayed reward, functioning in a routine work environment for 6 hours, demonstrating basic discrimination and matching skills, performing a three-step job task, performing a familiar job task with 90% accuracy, and imitating a two-step task after several demonstrations.

Prevocational Workshop

High-functioning deaf-blind students receive instruction in the prevocational workshop for one hour per day. Production workshop units are designed to teach work habits and skills. A product is selected by students and instructors for construction either on an assembly line or by group assembly techniques. The product is electrical, wood, or metal and is sold at cost; the money is then utilized to purchase additional materials. Products are designed to incorporate the use of a number of tools and techniques; there are varying levels of job tasks for the students to perform. Industrial Arts teachers instruct the students in the basic tenets of career exploration/industrial arts education, which are adapted to meet student needs.

Group Home

After the home living assessment, the middle- to low-functioning student receives individualized instruction in a dormitory setting at appropriate times. This training places major emphasis on the development of independence in self-help skills such as bathing, dressing, room cleaning, eating, etc. By the age of 16, or upon the development of independence in self-help skills, the student moves from the dormitory to a group home on campus. Emphasis is placed on refinement of self-help skills, simple food preparation, house cleaning, management of leisure time, and development of self-preservation abilities (e.g., recognizing danger and acting appropriately).

Home Living Skills and Independent Living Practice

The home living skills program for the high-functioning deaf-blind students includes units on shopping, budgeting, food preparation, house cleaning, laundry, and sewing. Instructors emphasize the basic skills and knowledge needed for a person to function in a home environment. Living skills are more important and harder to master than skills needed to succeed in a work environment. Home living encompasses all but 40 hours of a working person's week.

For independent living practice, a house on the campus grounds has been converted to accommodate four students per semester. Instructors residing with the students assist them in meeting their basic needs. The students plan menus and grocery lists, shop for food and prepare it, do their own laundry, and share cleaning duties. Self-initiation of these activities is a primary goal for each student. Time management is also an important component of this program. Having lived in a residential school or at home all their lives, these students have had few opportunities to structure their leisure time. Independent living practice is viewed

"An innovative component for the high-functioning deaf-blind is experience beyond the independent living practice house."

as a vital link between residential living and a lifetime of full or semi-independence as functioning adults.

An innovative component for the high-functioning deaf-blind is the provision of an additional experience beyond the independent living practice house. During the third year of the project, an apartment in the community will be utilized. Upon successful completion of living in the practice house, the students will have the opportunity to test their skills in a minimally supervised environment. The students will live without residential supervision, will be responsible for getting to school and/or work on time, and will manage their own leisure-time activities. The placement and work experience coordinator will be responsible for checking the students on a daily basis. The students will have the benefit of the school and staff as resources, but will be performing independently the same living tasks as their nonhandicapped peers.

In accordance with the educational/vocational track and the living track, emphasis is placed on communication, money, and leisure-time activities. An extended-day program recently has been initiated as part of the overall school program. It is designed to provide students with an opportunity to participate in well-planned and supervised activities to enhance maximum development of social and recreational skills. The students spend almost 75% of the calendar year on the school campus. Many of them consider the residential school "a home away from home." The residential school is not the final placement for these students; the total program must be geared toward preparing them to live in a post-school environment with both handicapped and nonhandicapped peers. The extended-day program provides students with the opportunity to participate in community activities—scouting shopping, and community excursions (circus, athletic events, movies, dances, dining in restaurants).

Work Experience and Vocational Training

The work experience program provides the student with a job, with pay, to develop a value for work. These experiences are subdivided into two phases: on-campus and off-campus. On-campus jobs include food service, janitorial and housekeeping service, personal service, clerical service, horticulture, and light industrial tasks. Off-campus jobs are coordinated with the Industries for the Blind, local sheltered workshops, and businesses in the community. Students, aged 16 and older, are referred to the state Vocational Rehabilitation Agency, and specific recommendations for summer and final placements are made.

Students are assigned two work-experience placements per school year. The length of training extends from 6 to 8 weeks; the number of hours worked is a maximum of three per day. A teacher or an aide accompanies the student for the initial period to ensure a smooth transition and assists the supervisor with any problems that might arise. A description analyzing a step-by-step training procedure is designed for each job. Teachers devise a task analysis of the training procedures to meet each student's individual needs.

Off-campus work experience involves a maximum of three hours per day. The length of training is determined by the employer and the coordinator. A prerequisite checklist is provided for the employer to indicate

Table 1
Information Received in Follow-Up Studies of Student's Work Placement

	Information Suppliers			
	Student	Family	Employer	Agency
Topics Covered:	job placement hours worked per week salary job changes and why amount of time unemployed satisfaction with present job any difficulties on job ability to maintain self in living situation satisfaction with living conditions general adjustment problems travel to job amount of wages contributed to support savings services required	student's satisfaction with job student's general behavior at home and at work family's satisfaction with job any problems student had keeping job student's ability to make friends	satisfaction with student's performance: quality of work quantity of work dependability adaptability job attitude job knowledge judgment initiative evaluation of student's abilities: interpersonal relationships major assets major limitations specific problems any necessary job/equipment modifications length of training period	services provided to student: counseling on-the-job training job placement evaluation medical assistance inservice training to employer

> "A teacher or an aide initially assists in acclimating the student to the job and the new surroundings."

the essential skills for a particular job. A teacher or an aide initially assists in acclimating the student to the job and the new surroundings. The employer is instructed in a communication system and then assumes supervision of the student.

A training plan serves as one element utilized in providing documentation for work experience. It outlines specific skills to be learned in attainment of the career objective stated in the life-long plan. Data are recorded on the performance of work tasks for each job assignment. Two evaluations are completed during each 8-week assignment. The students are rated in terms of their work habits, cooperation, job skills, etc. The coordinator is responsible for supervising training and keeping records of time and payment of each student.

In accordance with work experience, teachers and aides provide individualized instruction in completing job applications, using money (writing checks, banking, monetary value), managing time, using various communication skills, etc. During periods when students are not assigned to a job, teachers assist them in exploring various work samples to pinpoint specific strengths and/or weaknesses.

Vocational training activities directly relate to a specific job. The program has been designed to utilize various facilities in the community to provide instruction to students as well as on-the-job training.

E. H. Gentry Technical Facility—a trade school for the deaf and blind that provides vocational training in the following areas:

1. upholstery repair
2. clerical services
3. keypunch
4. commercial sewing
5. janitorial services
6. laundry services

Industries for the Blind—a sheltered workshop for the blind that provides work experience for students in the following areas:

1. paper products division—hole punch machine operator, paper shear operator, notebook wire machine operator, notebook stacker, notebook packer
2. sewing division—sewing machine operator, folders, product packagers, snap and clip installers
3. miscellaneous—food service worker, janitor, ball point pen assembler

Private Business—local businesses that provide on-the-job training in the following areas:

1. laundry services
2. vending machine operation
3. janitorial services
4. building and grounds keeping
5. gas station work
6. restaurant services

Follow-Up Studies

A significant component of the innovative program is the follow-up procedure. Upon graduation or completion of the program, it is imperative that information on the student's placement be obtained in order for the effectiveness of the program to be evaluated. This information also assists in restructuring the program to better serve entering students. Follow-up information (see Table 1) is obtained through the use of telephone contacts, letters, and/or personal contact with the student, the family, the employer, and the various agencies assisting the student (Brolin, 1976, p. 184).

Concluding Remarks

The innovative vocational program expands the services provided at the Helen Keller School of Alabama. Many professionals involved in the education of multihandicapped children have discussed and proposed a number of theories and techniques, but have failed to compile available information for the purpose of implementing a comprehensive vocational program. Education for life must begin pursuant to the identification of the handicapping conditions and must be adapted to meet individual student needs. Through the Training for Life Program, the staff at the Helen Keller School of Alabama is utilizing every possible means to prepare each student to reach his or her optimum level of functioning in the post-school environment.

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Communication Methods and Devices for Deaf-Blind Persons

Corinne K. Jensema

The enactment of Public Law 94-142 and the demise of the Regional Centers for Services to Deaf-Blind Children have greatly hastened the trend of local school systems assuming the responsibility of educating deaf-blind children. For the uninitiated, the task of prescribing communication methodologies for children with a dual sensory impairment is mind boggling.

The controversy over selection of appropriate communication modalities for the hearing impaired alone has been the topic of over 400 published materials (Corbett & Jensema, 1981). As Jensema and Trybus (1978) comment in their demographic survey of communication patterns of students in schools for the hearing impaired, little of this research has reflected the current state of affairs. Although modality of communication appears not to be as significant an issue in education of the visually impaired as it is with the deaf, similar problems with discrepancies between advocated methods and actual usage can be found. Research by Jones (1961) indicates that braille is taught more frequently in schools for the blind than is necessary for the number of children who actually need this kind of assistance.

Final selection of a communication system for a particular deaf-blind person should be based on an analysis of the answers to the following questions.

1. Does the person already have a communication system?
2. What is the extent of the person's sensory losses?
3. Does the person have sensory preferences?
4. What sensory systems can be utilized?
5. What are the mental and linguistic capabilities of the person?
6. What is the person's age and developmental level?
7. Are there any other handicaps or behaviors which may further limit communication?
8. What are the person's past, present, and future environments?
9. Are there any financial considerations that may affect purchase of communication devices? Training of staff?

Recent research has defined the extent of correlation between some of these factors and the methods actually in use in classrooms for deaf-blind children (Jensema, 1980).

It is important to remember that any communication system is a set of symbols used to relate experiences or abstract thought. The congruity with reality or abstraction of these symbols should depend upon the deaf-blind person's cognitive ability to make associations. A simplified hierarchy of symbolization, in order of increasing abstraction, is as follows:

1. Real objects
2. Scaled models of real objects
3. Photographs
4. Colored drawings
5. Line drawings
6. Pictographs
7. Idiographics
8. Abstract codes (i.e., letters, numbers)

Communication Methods

Some of the common and effective communication methods and devices used with deaf-blind persons are explained in this section. A more comprehensive list may be found in *A Complete Guide to Communication with Deaf-Blind Persons* (Kates & Schein, 1981).

Oral Communication Methods

Speech. This is the faculty of uttering articulated sounds or words to express thoughts (Webster's, 1961, p. 813). In its phonetic aspect, breath and voice are molded to form words. The chief purpose of speech is to convey ideas to the minds of those who hear it (Haycock, 1970, p. 15).

Tadoma Method. This method was developed by Sophia Alcorn, who had two deaf-blind students named Tad and Oma. In this method, the sense of touch is used for receptive language. The student puts his or her hand on the face of the person to whom he or she is talking. The thumb covers the mouth and feels the movements of the lips, jaw, and tongue. The four other fingers are spread over the cheek and jaw to pick up vibrations (Guldager, 1969, p. 3). (See Figure 1.)

Manual Communication Methods

Gestures. These are motions of the body or limbs intended to express an idea or a passion, or to enforce or emphasize an argument, assertion, or opinion (Webster's, 1961, p. 348). Guldager (1969, p. 3) suggests that words have meaning for normal children in terms of the movement which they convey or call forth. Language must also encompass movement for the deaf-blind child; however, if the conditions are congenital, natural gestures must be taught.

Signs. This is a system of conventional gestures of the hands and arms that by and large are suggestive of the shape, form, or thought which they represent (Silverman & Lane, 1970, p. 390). Recent research has found that significant information is also conveyed by the entire upper portions of the body. In general, one movement represents one word. Sign language may be received through residual vision or by placing the deaf-blind person's hands on those of the communicator (see Figure 2). Some educators consider the movements generally too large to be effectively transmitted tactilely (Guldager, 1969). Sign language frequently is

"Braille Hand Speech is especially useful for people who are blind from early childhood. . . ."

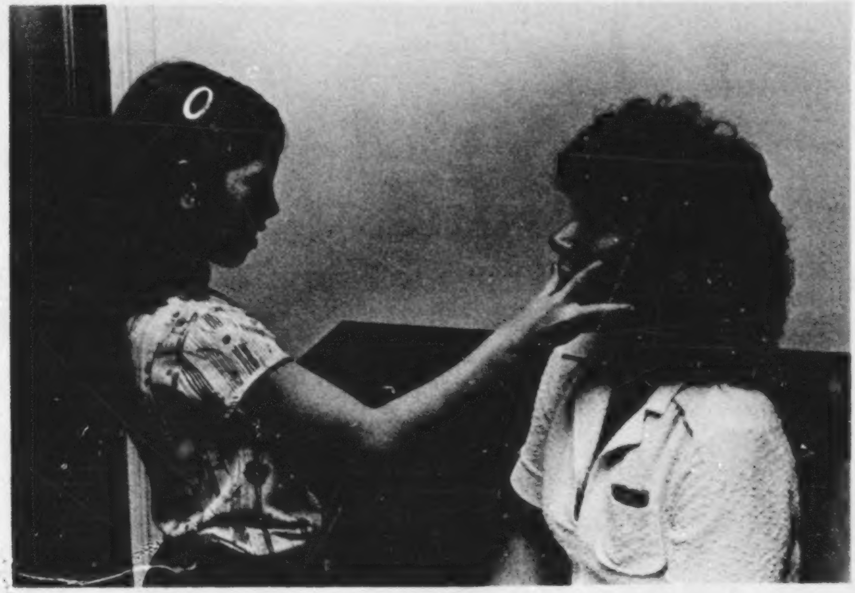

Figure 1
Tadoma Method

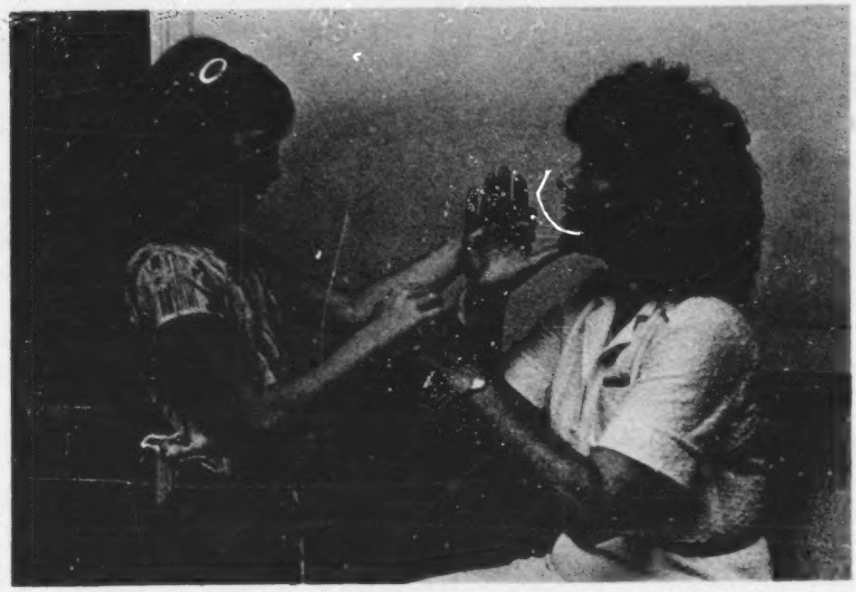

Figure 2
Sign Language

used by persons deaf from early childhood, who lose their vision later in life (Dinsmore, 1953).

Fingerspelling. In this method, the letters A to Z are formed into certain fixed positions of the fingers of one hand (Silverman & Lane, 1970, p. 390). This is sometimes referred to as the Rochester Method, after the school in which it was developed, but technically this approach combines fingerspelling with oral skills. The one-hand alphabet, perhaps, is the best-known form of tactile communication used with deaf-blind people in this country, and it is transmitted by placing the hand of the recipient over that of the speaker (see Figure 3).

Morse Code. The standard Morse Code used in the United States and Canada, as shown in Figure 4, can be a rapid and effective means of communication if signals are tapped on any part of the body or even on the floor (Dinsmore, 1953, p. 16). Morse Code is sometimes used by deaf-blind people in telephone conversations with or without a vibratory adapter, depending on the extent of a person's residual hearing (Kruger, 1974).

Cross Code. This is a signal system that was developed by a deaf-blind man to communicate with his family. It is based on the position of the signals on the back of the hand. The system can be easily transferred to any part of the body (Dinsmore, 1953, p. 17).

Braille Hand Speech. In this method, the deaf-blind person holds the initial, middle, and ring fingers of both hands in such a position that the tips of the fingers represent the six dots of the braille cell. Braille Hand Speech is especially useful for people who are blind from early childhood and subsequently lose their hearing (Dinsmore, 1953, p. 19).

Palmwriting. This is a method of communication generally used with people who have lost their vision after learning to read. It simply means that the communicator uses his or her index finger to draw the letters of the alphabet in the palm of the deaf-blind person to spell out messages (see Figures 5 and 6).

Glove Method. A thin white or tan glove that fits the deaf-blind person's hand is inscribed (as shown in Figure 7) with the letters of the alphabet on the palm and the numbers 1–10 on the back of the fingers. The letters of the alphabet are located on the tips of the fingers, the joints, and the palm of the hand at the base of the fingers, while the numerals appear on the fingernails and the knuckles. The communicator touches the letters and numbers that convey the message, much in the same way one would touch a typewriter.

Cued Speech. This is a method of communication designed for use with and among the deaf, in which eight shapes of one (either) hand are used in four positions near the face to supplement the information visible on the mouth. The combination of facial and hand movements provides a one-to-one visible representation of the syllables and phonemes of spoken language. Of the manual assistance communication methods used with hearing-impaired people, only Cued Speech and fingerspelling provide a complete morpheme-by-morpheme representation of verbal language (Cornett, 1975). Although there is no evidence in research of the use of this method with deaf-blind children, its growing prominence in deaf education warrants inclusion in this list (see Figure 8).

Written Communication Methods

Standard Print or Type. This is written communication approximately the size of pica or elite type. It can be rendered on lined or unlined paper. A person's ability to read this size print indicates good corrected vision or normal vision in a limited visual field.

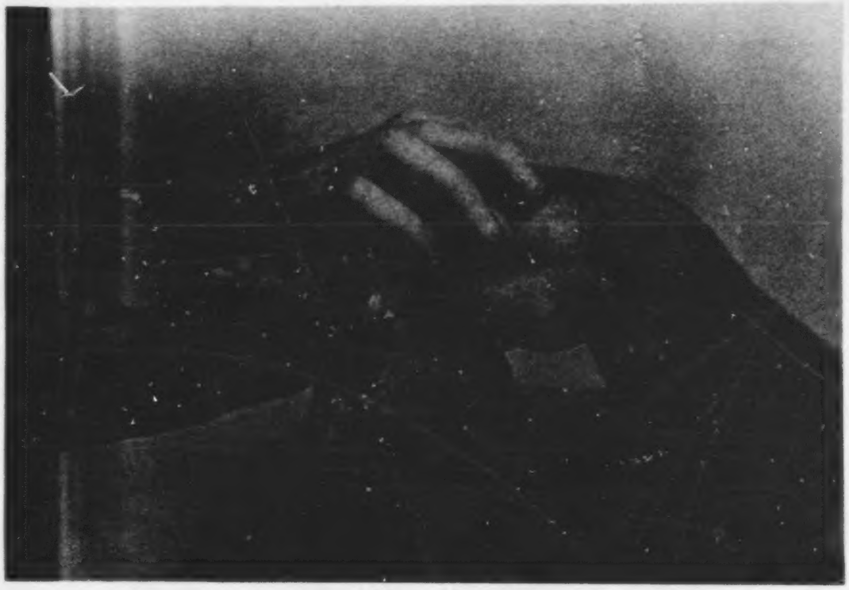

Figure 3
One-Hand Manual Alphabet (Fingerspelling)

Note. Communication with a deaf-blind person who knows the manual alphabet can be quite rapid. The finger positions are formed within the cupped hand. Certain letter formations are closely related, and it often speeds memorizing if they are learned in the following groups and in the order given: (a) A, C, E, O, S, T; (b) D, G, H, I, J, L, X, Z; (c) K, P; (d) M, N, Q; (e) B, F, R, U, V, W, Y.

A •-	1 4	N -•	4 1
B -•••	4 1 1 1	O ---	4 4 4
C -•-•	4 1 4 1	P •--•	1 4 4 1
D -••	4 1 1	Q --•-	4 4 1 4
E •	1	R •-•	1 4 1
F ••-•	1 1 4 1	S •••	1 1 1
G --•	4 4 1	T -	4
H ••••	1 1 1 1	U ••-	1 1 4
I ••	1 1	V •••-	1 1 1 4
J •---	1 4 4 4	W •--	1 4 4
K -•-	4 1 4	X -••-	4 1 1 4
L •-••	1 4 1 1	Y -•--	4 1 4 4
M --	4 4	Z --••	4 4 1 1

Figure 4
The International Morse Code

Note. International Morse Code has the advantage of being an inconspicuous communication method for people within touching distance of one another; is applicable to any part of the body; is potentially rapid; and is familiar to many Boy and Girl Scouts, members of the Armed Forces, and amateur radio operators. At its simplest, the dash is merely a stroke with the tip of the index finger, the dot a tap. When written in Braille, Braille dot 1 is used for the code dot and Braille dots 1 and 4 are used for the dash. On the telephone the dot is a 1 on the dial phone and the dash a 4.

"Some electronic devices can scan written material . . . and transfer it into braille units. . . ."

Figure 5
Palmwriting Letters

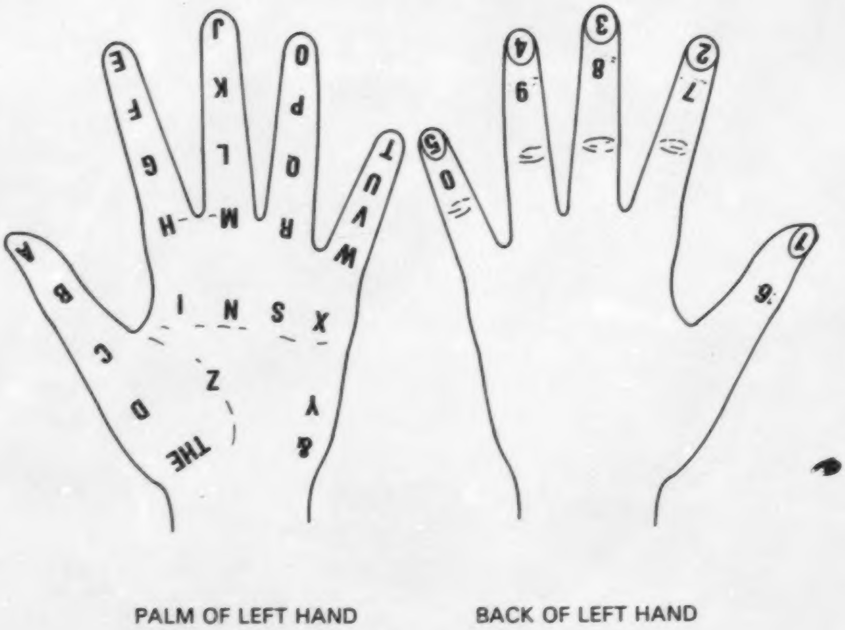

Figure 7
The Alphabet Glove

Large Print or Type. This is written communication rendered on lined or sometimes heavily lined paper, approximately the size of primary type. Large print is usually used by individuals with limited vision that is not sufficiently bad to warrant use of braille.

Braille. Invented in 1829 by Louis Braille, this system of communication employs variations of raised dots among two vertical columns of three dots each. Braille is the principle form of writing used by completely blind persons. Figure 9 shows the cell patterns of the letters of the alphabet. Braille can be produced using a stylus or a brailler (much like a typewriter) on heavy-grade paper. Some electronic devices can scan written material or receive direct communication from an individual and transfer it into braille units for a deaf-blind person.

Bliss Symbolics. This communication system, based on idio- and pictographic symbols developed by Charles Bliss, has proved to be an effective alternate communication mode for nonvocal, motorically impaired children of near normal and above intelligence (Harris, Note 1; McNaughton & Kates, Note 2; Ontario Crippled Children's Center, Note 3). Figure 10 shows some examples of Bliss Symbolics and their English equivalents. This method of communication is sometimes chosen because it increases the generalizability of a child's communication over pictures which tend to evoke a single thought or image. Because Bliss Symbols are less complex than words, children do not need sight reading and spelling skills before using them. By writing the English word equivalent under each symbol cluster, a person unfamiliar with the system can follow along.

Rebus Method. This method has a similar intent to Bliss Symbolics, but it utilizes pictorial, geometric,

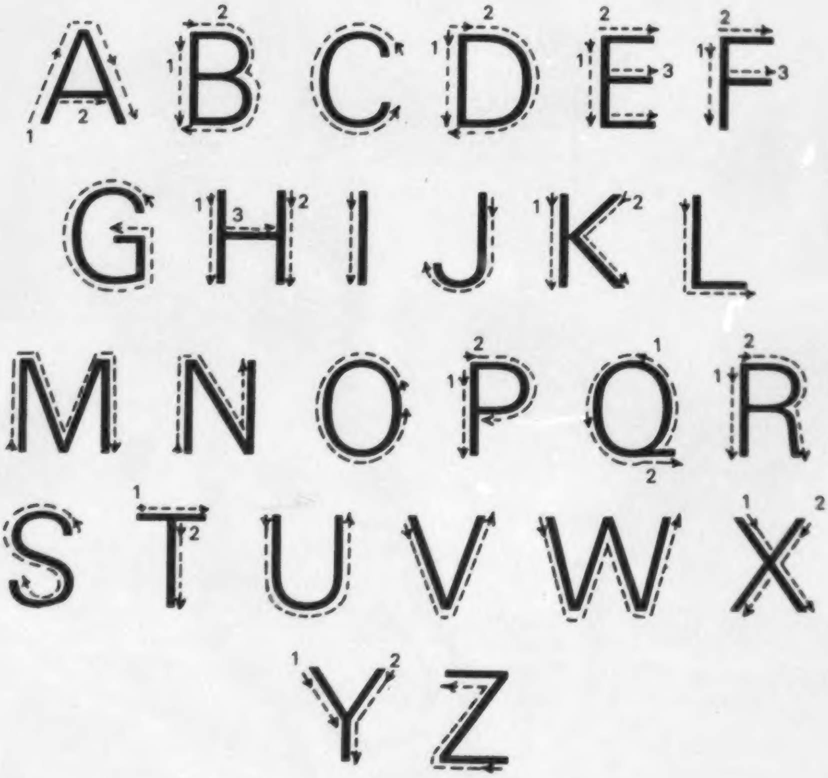
A B C D E F
G H I J K L
M N O P Q R
S T U V W X
Y Z

Figure 6
International Standard Manual Alphabet (Palmwriting)

> "Factors such as degree of muscular control and intelligence are involved in the process of matching an aid to an individual."

and abstract symbols. More recently, sign language pictures have been added to the lexicon. Figure 11 contains samples of Rebuses.

Communication Boards and Electronic Assists

Communication board is a term used to describe any prosthetic device composed of displays of objects, symbols, pictures, or words that enables nonvocal, expressively disabled, and often severely physically limited people to relate information. Existing communication boards can be divided into three categories according to how the nonvocal, severely handicapped individual operates them: scanning, encoding, and direct selection (Vanderheiden & Luster, Note 4). Factors such as degree of muscular control and intelligence are involved in the process of matching an aid to an individual.

Scanning Aids. These operate via a traveling pointer or light that scans sequentially through a display of possible selections (often the letters of the alphabet) until the operator stops the process. At that point the selection is printed or noted by the person receiving the communication. The scan resumes once this has been accomplished. Minimal physical control is required to operate such devices, but the process is slow due to the length of time required to scan for each communicative unit. The most primitive form of scanning occurs when the able-bodied person scans manually with a finger or a pointer.

Encoding Aids. Most employ selection of a series of numbers which have coded associated words or symbols. The words and symbols are usually on a display chart, but they can be memorized (see Figures 12, 13, and 14). They are more difficult to operate than scanners and require more intellectual ability, but permit the user to proceed at his or her own pace.

Figure 8
Cued Speech

Direct Selection Aids. These aids offer the greatest possible number of responses because the child can point directly to the word or character he or she wishes to communicate (see Figures 15 and 16). Electronic direct selection aids are available that print out the items the child has chosen. These devices require the greatest amount of physical control.

Communication boards can be operated by pointing or by electronic assists. Control mechanisms for electronic boards can be operated via touch, breathing, or biting, depending on the user's capabilities (Smith, Note 5). Output can be noted through typed recording, light signals, or audible alarms. One recently developed device produces an electronically synthesized voice in response to touch on a sensitive keyboard programmed with up to 991 phonemes and morphemes. The user can create a virtually unlimited English-language vocabulary by combining basic component sounds (Moberg, Note 6). Such a device would be appropriate only for a deaf-blind person who had a good command of English-language vocabulary (Moberg, Note 6).

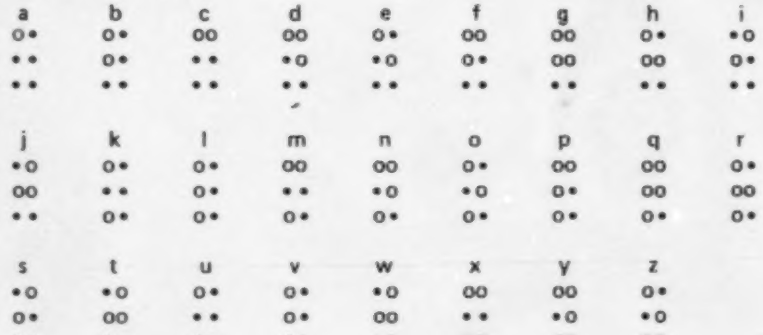

Figure 9
English Braille

"The development of electronic devices in recent years is currently having a revolutionary effect on the education of severely and profoundly handicapped individuals."

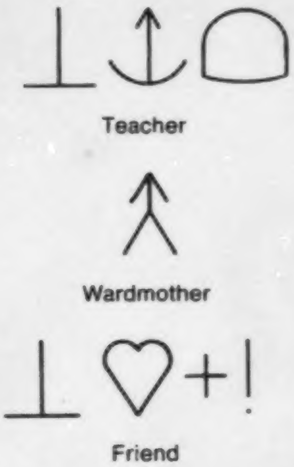

Figure 10
Bliss Symbolics

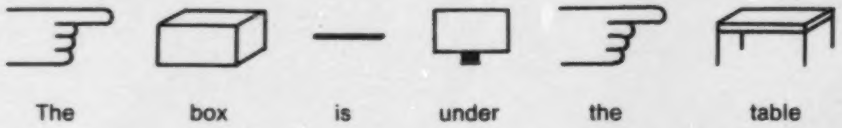

Figure 11
Rebus Symbols

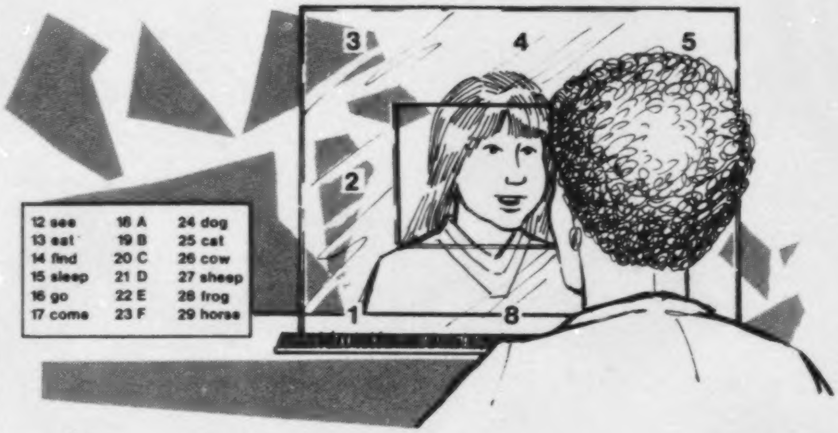

Figure 12

A Simple Two Number Encoding Aid That Interprets Eye Signals of the Communicator

Although mediated assistance has long been an integral part of classroom instruction, the development of electronic devices in recent years is currently having a revolutionary effect on the education of severely and profoundly handicapped individuals.

Group Auditory Trainers. These are used with deaf and deaf-blind students. The latest models are wireless, binaural systems that transmit and receive signals over government-approved interchangeable FM frequencies. These provide direct auditory communication between teacher and student with a high voice-to-room noise ratio (Moberg, Note 6). A similar group communication device without the peripatetic features is available for use with visually impaired students.

Electro-Brailler. This an electrical braille communicating aid that consists of a braille transcriber, which acts as a transmitter, and a braille-writer, which acts as a receiver. Schopper (1971) describes the braille transcriber this way:

> The braille transcriber is an adapter mounted on a braille-writer, a braille keyboard, or an ordinary typewriter. Pressing the keys down generates electric impulses which are converted into braille dots by the braille-writer. The brailled material appears in the form of an embossed tape (the device is thus a braille typewriter). (p. 47)

Some of the uses of this machine include classroom blackboard substitute, conference equipment and teletyper.

Braillemboss. A device similar to the Electro-Brailler, the Braillemboss was developed at the Massachusetts Institute of Technology. It also has computer time-share capabilities. A new braille system has been created that correlates symbols from the FORTRAN character set with individual braille symbols (Dalrymple, 1973).

Teletouch. This is a person-to-person device whereby the sender uses a typewriter-like keyboard to send messages. When a key is pressed, the corresponding braille letter is chemically raised on a braille

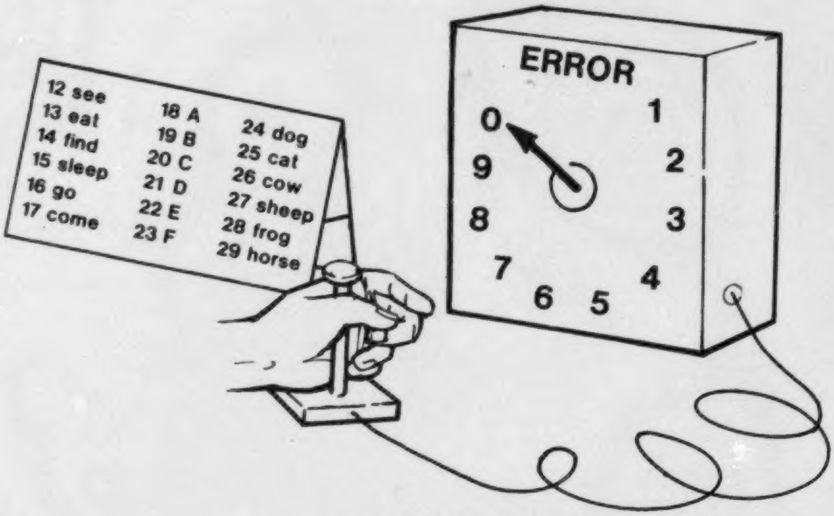
ERROR
0
1
2
3
4
5
6
7
8
9
12 see
13 eat
14 find
15 sleep
16 go
17 come
18 A
19 B
20 C
21 D
22 E
23 F
24 dog
25 cat
26 cow
27 sheep
28 frog
29 horse

Figure 13

An Encoding Aid Using a Rotating Pointer to Select Two Number Codes

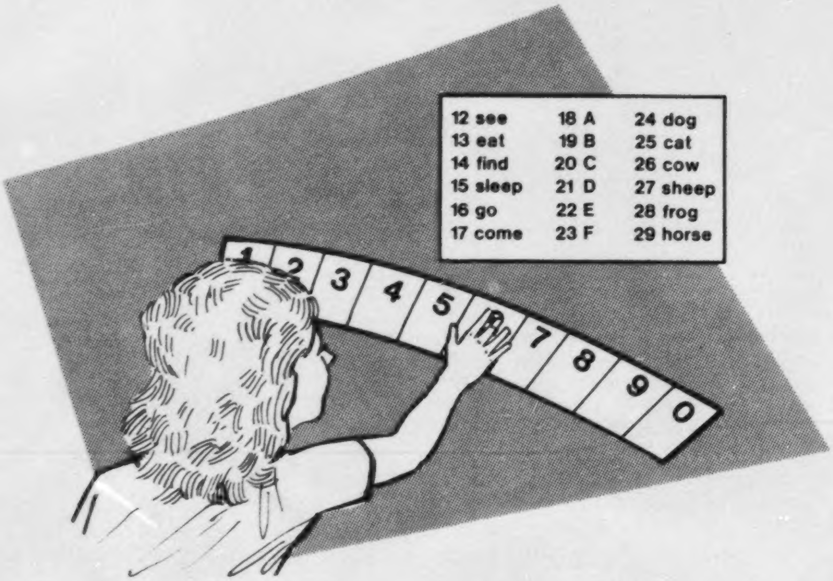
12 see
13 eat
14 find
15 sleep
16 go
17 come
18 A
19 B
20 C
21 D
22 E
23 F
24 dog
25 cat
26 cow
27 sheep
28 frog
29 horse
1
2
3
4
5
6
7
8
9
0

Figure 14

A Manual Encoding Aid Using Two Number Codes

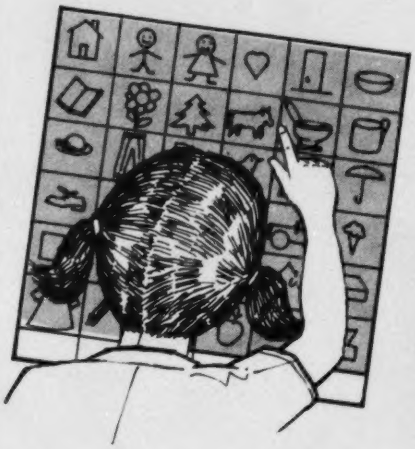

Figure 15

A Simple Chart-Type Direct Selection Aid

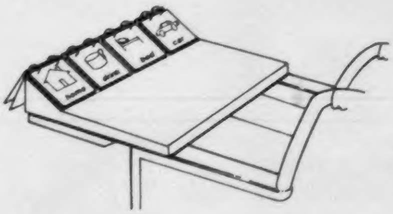
home
bed
car

Figure 16

A Laptray Direct Selection Aid

> "It is essential when selecting a method or combination of methods to choose those which are most acceptable to the student, not the trainer."

cell on the back of the Teletouch. The receiving person reads the braille with one fingertip (Kruger, 1974).

Optacon. This is an electronic scanner that converts printed material to raised print. The print appears on a single cell upon which the deaf-blind person keeps one fingertip—a similar process to using the Teletouch.

Deaf-Blind Communication Aid. Another person-to-person instrument that divides words spoken into a microphone into various sound frequencies and, through five circuits, activates finger-sized vibrators mounted in a small box. By placing a hand on the vibrators the deaf-blind person is able to feel the vibrations produced by the spoken word (Sumalt, Silver, & Kramer, 1972).

Several electronic devices have surfaced to facilitate telephone communication for deaf-blind people. Kruger (1974) offers the following definitions of two such devices.

> The Tactile Speech Indicator consists of an induction coil and an amplifier box with a vibrator output transducer. Questions are asked so as to require a yes or no answer. "Yes-yes" signifies an affirmative response, "no" a negative one; or dialing a "1" is used for yes, and a "4" for no. The voiced and/or click responses are felt on the output transducer.
>
> The Telebraille is designed to permit two deaf-blind persons to communicate over the telephone. The "speaker" sends braille using a keyboard similar to that on a brailling machine. Each braille letter is converted into corresponding audio-frequency-shifted binary strings which are acoustically coupled to a telephone handset. On the receiving end, the handset is acoustically coupled to an identical unit which converts the binary strings to signals that drive pins in the braille cell.

TAC-COM. This is one electronic device with a simple communicative missive. It contains a wireless transmitting unit that vibrates on the portable receiver to indicate that the handicapped person is wanted by the transmitting party. It can be used to communicate with people with a wide span of intellectual functioning (Dalrymple, 1973).

Wrist-Com. This device has paging capabilities plus capabilities to warn of emergencies, the ringing of a doorbell, and the ringing of a telephone. It has the added features of being comfortable to wear, waterproof, and shock resistant (Kruger, 1978).

Summary

The list of communication methods presented in this article is general and is presented as a tool for expanding thinking on communication strategies that can be used with deaf-blind persons. It is essential when selecting a method or combination of methods to choose those which are most acceptable to the student, not the trainer. Care should be taken to utilize methods that translate effectively into common discourse. Use of one method should not preclude use of others. Methods can be used simultaneously (e.g., speech and signs) or one method can be used as a lead-in to a more sophisticated method (e.g., gestures to signs). However, use of too many methods may confuse the student, especially the student with limited intellectual abilities. Whatever system is decided upon, it should be used consistently and as a means of casual conversation, not just instruction.

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The SPECIALNET Communication and Information Network

An Application of Computer-Assisted Telecommunications in Special Education

Robert Campbell

The application of computer technology has expanded considerably in the past 10 years. In the past 5 years advances in microprocessor technology have brought the microcomputer within reach of a vast new consumer market, not the least of which is the professional educator.

The microcomputer can serve several functions. Along with its capacity for being programmed, storing information and retrieving it, the microcomputer may be used as a communication device. The purpose of this article is to discuss the application of the microcomputer (and other similar devices) for communication. The discussion will include a further definition of computer-assisted telecommunications, a description of a computer-assisted telecommunications network for special education—SPECIALNET, and an explanation of the development of several informal information bases.

Computer-Assisted Telecommunications

Telecommunications is a broad term representing a number of technologies that utilize some form of electronic medium as a carrier to permit individuals and groups to interact with each other and with a variety of materials and information resources. Computer-assisted telecommunications is a text-based medium. It represents only one of the number of communications technologies under the umbrella of telecommunications. A more complete overview of telecommunications options may be found in Campbell, Snodgrass, and Gibbs (in press).

To describe computer-assisted telecommunication one must make use of some of the terminology commonly associated with computers. These terms include hardware, modem, and software.

Hardware

Hardware is a broad term used to describe computer equipment. A wide array of hardware may be utilized for the purpose of computer-assisted telecommunication. The basic item of the computer's hardware for text input is the terminal, the typewriter-like keyboard of a microcomputer, a word processor, or a minicomputer. In addition, a variety of terminals are commercially available that are specifically designed for communication. With minor exceptions, most keyboards are similar in configuration and will function in a similar manner. For the purpose of receiving information two options are available. The Cathode Ray Tube (CRT) has a television-like screen that provides a video display of the text. A second option for text display is the printer. When wired to the terminal, a printer will provide a paper copy *(hard copy)* of text. Both a CRT and a printer may be connected to the terminal to provide the user with either a video or a print option for viewing text. With this computer hardware and one other item, the modem, computer-assisted telecommunications is just a telephone call away.

Modem

The modem is a device that permits one to connect a computer terminal into the telephone line. Modem is an abbreviation for modulate-demodulate. The modem converts (modulates) the digital code of the computer into tones that may be transmitted through telephone wires to another modem which then reconverts (demodulates) the tones to the computer digital code. In this way, computer terminals with a modem wired into their circuitry can be utilized for communication purposes.

Software

The instructional package that tells the computer and the user what to do is known as software. Generally, unless computers are from the same manufacturer and can utilize exactly the same software program, communication between their users is impossible. That is, computers of one manufacturer are not generally compatible with that of other manufacturers; therefore, their software programs cannot be operated interchangeably. Yet, software is a necessary component for computer-assisted telecommunications. For this reason a number of commercial vendors offer a service that not only provides the necessary communication software but can also match the vendor's computer to nearly any other computer presently manufactured. In this way, someone using XYZ manufacturer's terminal can send text to a commercial vendor's computer and, in turn, the computer can send that text on to someone using an ABC terminal. When a group of individuals using the same or different terminals for similar communication purposes utilizes a commercial vendor's computer system, they are said to belong to the same network.

The number of computer-assisted telecommunications networks is growing rapidly. Networks presently exist that allow a user to access the latest stock market quotes, newspapers and news wire services, airline guides, restaurant information, and hundreds of other information resources. A major new network, designed as a communication and information network for general and special educators, has emerged in the past year. SPECIALNET is a special education computer-assisted telecommunication network being developed

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> "Telemail . . . uses the SPECIALNET computer as a mailbox."

in conjunction with the National Association of State Directors of Special Education (NASDSE).

SPECIALNET

SPECIALNET uses the General Telephone and Electric system TELENET. The main-frame computer that operates the TELENET program is located in Vienna, Virginia. This system provides SPECIALNET users with access to each other by providing the communication software and access to telephone ports (i.e., special phone numbers) in most cities throughout the country with a population of 50,000 or more. It also reaches rural areas through WATS line service.

In order to access SPECIALNET the user dials a local or WATS number. When contact is made, a computer carrier tone is heard and the telephone head set is placed in the modem. The *enter* or *return* button on the terminal is depressed twice to activate access to the main-frame computer. The user is then asked to identify the type of terminal being used by typing in a simple code. Next, the user is asked to identify himself or herself as a member of the network by typing in a user name and a password. The password, known only to the user, does not print; it provides security from unauthorized access. Once signed on, the user is welcomed to the network, told when the last access was made to the network (another security device), and is provided a time and a date display. The user has now accessed SPECIALNET and a number of communication and information options become immediately available.

Communication Options

There are at present approximately 500 SPECIALNET subscribers in 40 states. Subscribers include state departments of education, local education agencies, regional resource centers, universities, schools for the deaf, and many other individuals in the field of special education. These agencies and individuals make up the network to which SPECIALNET users may communicate through what is called *telemail.*

Telemail is a computer mail system that uses the SPECIALNET computer as a mailbox. The user types a message to another user on the terminal and sends it to the SPECIALNET computer. The message is stored there until the intended recipient makes contact with SPECIALNET. When contact is made, the message is automatically posted for delivery and appears on the recipient's screen or printer. (See Figure 1.) A number of send options are available. These include

1. AFTER date time—Posts the message for delivery as soon as possible after the specified date and time.
2. EVERY time period, xx TIMES—Posts the message on a repeating basis according to the specified time period.
3. EVERY time period BEFORE date time—Posts the message on a repeating basis according to the specified time period and discontinues posting as of the specified date and time.
4. ON date time—Posts the message for delivery on the specified date and time.
5. RECEIPT—Posts the message for immediate delivery; with *Return Receipt* the sender receives a system notification of the date and time the recipient reads the message.
6. REGISTERED—Posts the message for immediate delivery; the recipient must acknowledge the message before he or she can read it, and the sender receives a system notification of the acknowledgment.
7. URGENT—Posts the message for immediate delivery. The message is placed at the top of the recipient's sign-on scan table with an URGENT flag.

When the intended recipient of the message makes contact with SPE-

```
You will see: COMMAND
You type: COMPOSE
You will see: TO:
You type: (Enter the name of the SPECIALNET user who is to receive your
          message, e.g., MSSD.)
You will see: CC:
You type: (Enter any SPECIALNET users to whom courtesy copies are to be sent.)
You will see: SUBJECT:
You type: (Enter a brief description of the message topic.)
You will see: TEXT
You type: (Enter your message.)
You type: (Type a period on a line by itself to end the message.)
You will see: SEND?
You type: Yes
You will see: MSG POSTED (date) (time) MSG: XXXX-1234-4678
```

Figure 1

```
USER NAME? MSSD
PASSWORD? (Doesn't print)
Welcome to Telemail! Your last access was Wednesday, March 25, 1982, 11:06 AM
No.    Delivered       From   Subject                    Lines
1.     Mar. 25 13:53   TRD    Article on SPECIALNET       3
Command: Read 1
Posted:     Thur Mar. 25, 1982 1:51 PM EST MSS: ABCD-1234-4678
From:       TRD
To:         MSSD
CC:         APT
Subj:       Article on SPECIALNET
Thank you for the opportunity to describe SPECIALNET in Directions. I am
particularly excited about the MULTIHANDICAPPED Electronic Bulletin Board.
The manuscript should be in your hands on Mar 31, 1982. Bob Campbell.
Action?
```

Figure 2

CIALNET, the message is automatically delivered. For example, if a message had been sent to the Model Secondary School for the Deaf (MSSD) at Gallaudet College, it would be posted as shown in Figure 2 when MSSD signed on to SPECIALNET.

At this point MSSD would have several options for ACTION regarding this message.

1. ANSWER—Create a reply to the sender (TRD).
2. FORWARD—Send a copy of the message to other SPECIALNET users.
3. PURGE—Delete the message.
4. FILE—Store the message under a file name.
5. EXIT—Return to the prompt, COMMAND? (Does not alter message, message remains in mailbox.)

These examples demonstrate the basic person-to-person communication functions of SPECIALNET's telemail options. In addition, it is possible to edit entire texts by using a variety of editing commands that are built into the system. Further, information can be organized into files—files of computer memory. A file name is created and then assigned as a label to any number of messages. Finally, when a user sends messages frequently to several users (e.g., state departments of education), mailing lists may be created that permit messages to be sent to any number of users.

Information

SPECIALNET represents a powerful communication medium for special educators. It also represents a major information base. By connecting individuals and agencies into local, regional, state, and national networks, common resources may be shared to solve common problems facing special educators in diverse settings and geographic locations. This person-to-person information base is further extended by SPECIALNET through an electronic bulletin board system.

The electronic bulletin board is not unlike its nonelectronic counterpart. Information on a wide range of topics is displayed on a growing number of electronic bulletin boards. The SPECIALNET user has a choice of which bulletin boards to read and which items to read in each bulletin board. The administrator of each electronic bulletin board also acts as a professional and technical resource to users. Therefore, the bulletin board administrator becomes an additional information resource to users in specific special education areas. In addition to the growing number of bulletin boards described in the following list, a number of statewide networks (e.g., Pennsylvania, West Virginia, Colorado, and Florida) maintain electronic bulletin boards that contain state-specific information. The national electronic bulletin boards include:

1. FEDERAL—Describes current events at the national level, particularly congressional and administration action related to special education. Information is provided by NASDSE.
2. CSPD—Provides information on the Comprehensive System of Personnel Development. It features information on current preservice/inservice practices and available resources. Relevant information for this bulletin board may be sent by composing a message TO: CSPD.
3. CONFERENCE—Contains a list of special education-related conferences. Upcoming conferences may be listed by composing a message TO: CONFERENCE.
4. COMPUTER—Contains information on computer applications in special education.
5. EDUTECH—Provides up-to-date information on a wide array of technologies related to special education.
6. TELEVISION—Summaries of television shows, videotapes, etc., are included on the television bulletin board. Also included are procedures for accessing and making maximum use of local cable TV networks.
7. CONGRESS—Lists members of U.S. Congressional committees, with addresses, phone numbers, and party affiliations.

> "The MULTIHANDICAPPED bulletin board has become a cost-effective way of meeting project objectives for dissemination and technical assistance."

8. CONSULTANT—Lists consultants in various areas of special education. Any consultant can be listed; no judgments are made regarding consultant qualifications. Consultants may be listed by composing a message TO: CONSULTANT.
9. EMPLOYMENT—Lists employment opportunities in special education. Employment announcements may be sent to this bulletin board by composing a message TO: EMPLOYMENT.
10. LITIGATION—Describes court cases and hearing decisions; includes references to assist the reader in obtaining in-depth information on particular cases. Updates are supplied by the editors of *Education of the Handicapped Law Review.*
11. OPINIONS—Functions as SPECIALNET's "Letters to the Editor." It provides users with an opportunity to express opinions about issues in special education. Messages may be sent TO: OPINIONS.
12. PRACTICES—Describes promising practices from around the nation regarding the provision of services for handicapped students. Information should be sent TO: COUNTERPOINT.
13. RFP—Provides information regarding available grants and requests for proposals that relate to special education. Data is supplied by NASDSE.
14. EARLY CHILDHOOD—Contains information pertinent to early childhood education. Send information TO: EARLYCHILDHOOD.
15. MULTIHANDICAPPED—Provides information on curriculum materials, resources, technical assistance, services and programs for school-age multihandicapped persons. Information may be placed on this bulletin board by sending a message TO: MULTIHANDICAPPED.

Each of these bulletin boards provides updated information at regular intervals. SPECIALNET as well as non-SPECIALNET subscribers are encouraged to share their information and resources on the appropriate bulletin boards. It is hoped that special educators will learn to view these bulletin boards as extensions of their dissemination resources and will share their activities as they would through traditional information outlets. Such bulletin boards as PRACTICES, EARLYCHILDHOOD and MULTIHANDICAPPED are particularly suited to sharing resources related to the instructional needs of children and youth. To further clarify this concept, the MULTIHANDICAPPED electronic bulletin board is described more fully in the following section.

The MULTIHANDICAPPED Electronic Bulletin Board

The development of this bulletin board was initially a response to the declining resources of the National Training and Demonstrations Consortium for Severely Handicapped/Hearing Impaired Individuals. The MULTIHANDICAPPED bulletin board has become a cost-effective way of meeting project objectives for dissemination and technical assistance. The bulletin board is intended to be an information resource for practitioners who are working with mentally retarded, hearing-impaired, deaf, deaf-blind, visually impaired, health-impaired, or multihandicapped people. Information related to curriculum, service delivery, program development, assessment, and instructional methodology is emphasized. In addition, new commercial products and teacher-made materials are highlighted regularly.

Although any individual or agency subscribing to SPECIALNET may send information to the bulletin board, nonmembers also are encouraged to share their information and resources through the consortium. Member sites of the Consortium for Severely Handicapped/Hearing Impaired monitor the bulletin board daily for questions from the field and willingly input information for any individual or agency requesting assistance. A listing of consortium members participating in the bulletin board's administration is included at the end of this article.

Retrieval of information from any of the bulletin boards, including the MULTIHANDICAPPED bulletin board, is an easy process. Once access to SPECIALNET has been obtained (as previously described), the user may select access to the bulletin boards desired by responding to the computer's COMMAND? prompt as shown in Figure 3.

If the user wanted to look for information in the bulletin board placed at another time besides the date of access, several options are available. Instead of ON DATE, you would type, SCAN ALL (provides every entry contained), SCAN SINCE (DATE), SCAN BEFORE (DATE), and SCAN (SUBJECT). The MULTIHANDICAPPED bulletin board provides users with several general (key word) headings for scanning by subject. In addition, any key word in a subject heading (from the scan table) may be used to access particular information. The general category or subject headings used for the MULTIHANDICAPPED bulletin board include the following:

1. RESOURCES—Program, curricula, training available (both preservice and inservice), service descriptions, and any other infor-

"Expanding the base can only be accomplished if special educators will participate."

mation that might assist persons working with multihandicapped children or youth.

2. NEWS—Items regarding litigation, forums, workshops, symposia, conferences, legislation, and all other newsworthy items of a "did you know" nature.
3. PROGRAMS—Items related to services available, model development, private and public programs serving multihandicapped.
4. QUESTIONS—Requests to the board for information related to meeting the needs of multihandicapped, including consultants, assistance in developing programs, and any questions the field may provide assistance in answering.
5. PUBLICATIONS — Commercial or project-prepared texts and other products related to the multihandicapped population.
6. PROFILE—Descriptions of innovative projects and programs with resources to share regarding multihandicapped individuals.
7. MEDIA:—Audiovisual materials that relate to the needs of multihandicapped individuals, including films, videotapes, audiotapes, etc.

In summary, the MULTIHANDICAPPED bulletin board, as well as the other bulletin boards on SPECIALNET, represents a powerful, informal data base for special educators. MULTIHANDICAPPED provides individuals and agencies with an expanding resource for sharing new insights into the creative and innovative work of many people in the field of special education. This information base is only as good as what is placed in it; expanding the base can only be accomplished if special educators will participate.

```
    You will see:  COMMAND?
    You will type: CHECK MULTIHANDICAPPED
    You will see:  NOW USING BULLETIN BOARD
                   COMMAND?
    You type:      SCAN ON 3-17
    You will see:  BULLETIN BOARD CONTAINS:
No.  Delivered      From   Subject                               Lines
1    MAR. 17 13:53  MSSD   RESOURCE: TUITION-FREE HIGH SCH        17
2    MAR. 17 17:09  APT    NEWS: UPDATE N.Y. MHC DEAF TASK F       8
3    MAR. 17 18:28  APT    RESOURCE: DEAF STORYTELLERS            11
4    MAR. 17 12:43  TRD    RESOURCE: INDEPENDENT LIVING CU         6
```

From the subject heading, users would be able to determine whether that information is appropriate for their needs. For example, if items No. 1 and 2 would be useful to the user, the following response would be made.

```
You will see:  COMMAND?
You type:      READ 1,2
You will see:
POSTED:  WED MAR. 17, 1982
         1:52 PM EST
         MSG: UGDF-1378-2766
FROM:    MSSD
TO:      MULTIHANDICAPPED
SUBJ:    RESOURCE: TUITION FREE HIGH SCH
THE MODEL SECONDARY SCHOOL FOR THE DEAF (MSSD) WAS ES-
TABLISHED BY AN ACT OF CONGRESS (PL 89-694) IN 1966. MSSD IS
LOCATED ON THE CAMPUS OF GALLAUDET COLLEGE AND PROVIDES
A FULL RANGE OF ACADEMIC AND ELECTIVE COURSES. EXPOSURE
TO VOCATIONAL CAREER AREAS, WORK-STUDY PROGRAMS, AND
EXTRACURRICULAR ACTIVITIES. REQUIREMENTS FOR ENTRANCE
INCLUDE: (1) SEVERE OR PROFOUND HEARING LOSS (AVERAGE OF 70
DB OR GREATER IN BETTER EAR); (2) 14-19 YEARS OLD; (3) THIRD
GRADE READING LEVEL OR HIGHER DEMONSTRATED ON READING
SUBTEST OF THE STANFORD ACHIEVEMENT TEST 1974 HEARING
IMPAIRED EDITION. FOR MORE INFORMATION, WRITE OR CALL THE
ADMISSIONS OFFICE, MODEL SECONDARY SCHOOL FOR THE DEAF,
GALLAUDET COLLEGE, KENDALL GREEN, WASHINGTON, DC 20002;
(202) 651-5841.
```

Figure 3

A Final Note on Cost

As indicated, the Consortium for Severely Handicapped/Hearing Impaired has found SPECIALNET to be a cost-effective addition to meeting its national responsibilities for dissemination and technical assistance. Access to SPECIALNET involves two costs (not including the cost of hardware). First, a yearly subscription fee of $200 is charged. Second, the user is charged for connect-time (the period when actually connected to the network) at a specific cost per hour depending on the time of day. Table 1 outlines these basic costs.

For further information regarding costs, interested individuals or agencies should contact NASDSE (see Additional Resources).

POSTED: WED MAR.17, 1982
5:09 PM EST
MSG:DGDF-1380-3182
FROM: APT
TO: MULTIHANDICAPPED
SUBJ: NEWS: UPDATE N.Y.
MHC DEAF TASK FORCE

UPDATE NY MH DEAF TASK FORCE A SECOND GROUP OF PROFESSIONALS FROM UPSTATE N.Y. PRESENTED TESTIMONY TO HOWARD BABBUSH AND HIS SENATE MINORITY TASK FORCE ON THE NEEDS OF MULTIHANDICAPPED DEAF YOUNG ADULTS ON MARCH 4, 1982. REPRESENTATIVES FROM GROUP HOMES, SCHOOLS FOR DEAF (NYSSD, ST. MARY'S), AND POST-SECONDARY PROGRAMS (NTID) WERE PRESENT IN ROCHESTER TO PRESENT THEIR VIEWS. IT IS DIFFICULT TO KNOW HOW FAST OR IF ACTION WILL BE TAKEN TO SECURE SERVICES FOR THIS GROUP IN THE NEAR FUTURE. BUT, AT LEAST THE "PAPER WORK" IS BEING GATHERED. WILL KEEP YOU POSTED.

Figure 3 (continued)

Table 1
Basic Costs for Gaining Access to SPECIALNET

Hours	Basic Charge (Session)	INWATS Charge (WATS)
Business Hours	$14.00/hr	$23.00/hr
M-F 7am-6pm	.23/min	.38/min
Off-Peak Hours	7.00/hr	14.00/hr
M-F 6pm-9pm	.12/min	.23/min
All Day Sat., Sun., & Holidays		
Night Hours	4.00/hr	6.00/hr
Everyday 9pm-7am	.07/min	.10/min

Note. Storage Charge was $.005/day/storage unit of 2,000 characters after first five days. Broadcast Delivery was $.05/addressee after the first addressee of a broadcast message.

Additional Resources

For more information on SPECIALNET contact:

Gary Snodgrass, Admin/SPECIALNET
National Association of State Directors of Special Education
1201 16th Street, N.W., Suite 610E
Washington, D.C. 20036
Telephone (202) 833-4193 or
SPECIALNET USER NAME: NASDSE

For more information or to enter information to the MULTIHANDICAPPED bulletin board contact:

Dr. Robert Campbell, Admin/MULTIHANDICAPPED
Teaching Research Division
345 N. Monmouth Avenue
Monmouth, OR 97361-1394
Telephone (503) 838-1220 (Ext. 391) or
SPECIALNET USER NAME: TRD

Drs. Christine Pawelski and Alan Groveman
Lexington School for the Deaf
30th Ave. & 75th Street
Jackson Heights, NY 11370
Telephone (212) 672-8099 or
SPECIALNET USER NAME: APT

Dr. Larry Larsen
Division of Education
The Johns Hopkins University
Baltimore, MD 21218
Telephone (301) 338-8273 or
SPECIALNET USER NAME: JHUL

References

Campbell, B., Snodgrass, G., & Gibbs, L. Telecommunications: Information systems for special education's future. *Journal of Special Education Technology,* (in press).

New from ERIC

Documents listed below have been selected by Jean N. Nazzaro, an information specialist with the ERIC Clearinghouse on Handicapped and Gifted Children. The Clearinghouse is operated by the Council for Exceptional Children, 1920 Association Drive, Reston, Virginia 22091, and is funded by the National Institute of Education. ERIC documents may be ordered from ERIC Document Reproduction Service (EDRS), P.O. Box 190, Arlington, Virginia 22210.

ED 209 908

Recall of Different Segments of an Interpreted Lecture by Deaf Students.
Stinson, Michael; and others; March 1981, 23 p.
National Technical Institute for the Deaf,
Rochester, New York

Two experiments involving 36 deaf college students investigated the amounts of information remembered by students from the different quarters of a lecture and the effect of printed vs. interpreted presentation of lecture material. In the first experiment, 20 deaf college students received an interpreted, videotaped presentation of one lecture and a printed presentation of a second lecture. In Experiment 2, 16 deaf students received one interpreted presentation and, then, a second interpreted presentation in a different topic. In both experiments, students wrote down the information they remembered immediately after each presentation. Recall protocols were scored for the distribution of ideas recalled from each quarter of the lecture. The principal findings were that students recalled: more information from the first two quarters than from the second two; more information from a printed than an interpreted presentation; and more information from a second interpreted presentation than from a previous interpreted one. Implications are drawn for providing educational support to mainstreamed deaf students.

ED 209 907

Locus of Control: Review and Implications for Instruction of the Hearing-Impaired.
Dowaliby, Fred J.; Pagano, Jo Anne; January 1981, 51 p.

The authors review research on locus of control (LOC), particularly as it pertains to the instruction of hearing-impaired students. According to social learning theory, the LOC construct theorizes that two distinctly different types of persons can be identified—"internals" who assume responsibility for their activities and "externals" who are likely to ascribe the consequences of their behavior to forces outside their influence. Studies addressing specific research questions are organized under seven categories—dimensionality, correlates, instruction, deafness, disabilities, changeability, and amendments and contributions of attribution theory.

ED 209 906

Practical Procedures for Test Length Reduction and Item Selection.
Garrison, Wayne M.; Coggiola, Deborah C.;
September 1980, 20 p.
National Technical Institute for the Deaf,
Rochester, New York

The study involving approximately 300 deaf students entering the National Technical Institute for the Deaf was designed to determine the extent to which four cognitive measures could be reduced in overall length without serious threat of information loss. The measures investigated were the California Reading Comprehension Test, the Mathematical Skills Program, the Abstract Reasoning Test, and the Space Relations Test. In all instances, the correlation between reduced and full-length tests is very high and positive, indicating that control over the distribution of the difficulty indices associated with the items in a test produces efficient tests requiring substantially fewer stimuli than those included in the original design sets.

ED 209 904

Career Development Theory: An Interactive Adjustment Model for Career Education.
Lutz, John E.; October 1980, 38 p.

The paper looks at the value and need for theory, specifically as it relates to career development/career education for the deaf. A review of the literature provides an overview of major theoretical ideas regarding career development. An interactive adjustment model is described which incorporates four parameters: personal characteristics, environmental interactions, learning activities, and social experiences. The career development model is outlined in terms of corresponding postulates, deductions, and definitions. Several research hypotheses related to career development of the deaf are offered. Tables and figures illustrating the model conclude the paper.

ED 209 903

Relations between Word Meanings and Identification of Words in Spoken Sentences by Hearing-Impaired Children.
Stinson, Michael; August 1980, 25 p.
National Technical Institute for the Deaf,
Rochester, New York

Two experiments involving 44 normal hearing and 26 hearing-impaired children (7 to 12 years old) investigated children's use of sentence context to identify words in sentences that are not clearly intelligible. In Experiment 1 Ss read incomplete sentences and chose which of two word pictures best completed the sentence. From these responses, 12 sentences were identified (8 sentences in which rhyming test words were predictable from the context and 4 in which one word from the test word pair was not predictable). In Experiment 2, 21 of the same hearing-impaired children, who met strict speech discrimination training criteria, heard variations of the 12 sentences over headsets in which the relationship between a context word and one of a rhyming test word pair was either reasonable, unreasonable, or neutral. After each sentence, the children decided whether they had heard the test word or its alternative which differed in either the initial or final consonant. Significantly more correct identifications were made on the reasonable and neutral sentences than on the unreasonable ones. Average means were 81% on the reasonable sentences, 64% on the neutral ones, and 34% on the unreasonable ones.

ED 209 902

The Dimensions Used by Hearing Impaired Students to Make Judgments of Instructors and Courses: A Factor Analytic Study.
McKee, Barbara G.: Dowaliby, Fred J.; March 1980, 25 p.
National Technical Institute for the Deaf,
Rochester, New York

The study involving 385 students enrolled in the National Technical Institute for the Deaf investigated the dimensions used by hearing-impaired students to make judgments about their instructors and whether these underlying dimensions are similar to those reported for hearing students. Data from a large-scale field test of a student rating of instruction form were factor analyzed. The underlying dimensions of the instrument were identified, labeled, and then compared to the dimensions frequently reported in the literature on student rating of instruction. Results indicated a strong similarity between the dimensions used by hearing-impaired students and their hearing counterparts in making judgments about instructors and courses. Tables with statistical data are appended.

ED 209 901

Perceptions of Student Social Performance.
Emerton, R. Greg; and others; November 1978, 36 p.
National Technical Institute for the Deaf,
Rochester, New York

The study, involving 27 students entering the 1977 National Technical Institute for the Deaf orientation program, examined and compared perceptions of student social performance as viewed by resident advisors, counselors, and the students themselves. Social Performance Indicator protocols were obtained for Ss. Results indicated high evaluations of student social behavior. A common concern for student self-identity was also indicated by all three groups. Figures and tables with statistical data are included, and a sample copy of the Social Performance Indicator and a list of results are appended.

ED 209 900

Relationships among Spatial Skills, Communication Skills and Field Dependence in Deaf Students.
Parasnis, Ila; Long, Gary L.; August 1978, 35 p.
National Technical Institute for the Deaf,
Rochester, New York

The hypotheses that deaf students would be more field dependent than hearing students and that their competence in communication skills would be related to field dependence were supported for a group of 77 male and 67 female deaf students at the National Technical Institute for the Deaf. Stepwise multiple regression analyses of the data showed that for females, spatial skills followed by communication skills were significant predictors of field dependence; for males, spatial skills followed by the extent of hearing loss were significant predictors of field dependence. Sex differences found on tests of field dependence and spatial relations were consistent with those obtained from the hearing population. Results supported the notion that socialization experiences and competence in communication skills may influence development of field dependence in deaf students.

ED 209 899

Self-Concept and Deafness: A Review of Research Literature.
Garrison, Wayne M.; Tesch, Stephanie; 1978, 25 p.
National Technical Institute for the Deaf,
Rochester, New York

The paper reviews some of the research literature relating to self-concept and deafness. In summarizing the relevant research, attention was given to the types of questions to which researchers have sought answers, the theoretical orientations which have guided investigations, and the kinds of methodological problems which have characterized research in this field. It was noted that the severest limitation in research with the deaf rested with the inappropriateness of testing devices, a situation not uncommon to research on personality attributes of other groups of persons. Moreover, the need to investigate self-concept from a developmental perspective was viewed as central to the task of better understanding the life adjustment of the deaf individual.

ED 209 898

Networking: A Semantic-Based Learning Strategy for Improving Prose and Comprehension.
Long, Gary; and others; 1978, 50 p.
National Technical Institute for the Deaf,
Rochester, New York

The paper focuses on networking, a process of identifying and understanding the relationships among concepts in prose passage, as a learning strategy for deaf college students. It is explained that students using the technique perform three basic overlapping processes, one of which, identification and understanding of concept relationships, is the subject of a literature review. Reported are findings of evaluations conducted during three networking training sessions involving 56 students from the National Technical Institute for the Deaf (NTID). During each session, NTID students were trained on the networking procedure and then asked to study prose passages and use their new study strategy. Findings using the relatively short (500 word) passages in sessions I and II suggested that networking has a greater impact on long-term retention of prose than on immediate test performance and that networking has more of an impact when students write out their networks than when they network material in their heads. There were mixed results regarding the performance on the longer (1,000 word) articles of session III. Appended is information on definition, example characteristics, result, and compare/contrast relationships.

ED 209 897

Deafness and Self-Disclosure: Some Problems in Interpreting Self-Concept Measures.
Garrison, Wayne M.; and others; April 1980, 64 p.
National Technical Institute for the Deaf,
Rochester, New York.

The Tennessee Self Concept Scale (TSCS) was administered to 109 students newly enrolled at the National Technical Institute for the Deaf. Consistent with earlier research literature, test results indicated that the deaf students had lower levels of self-esteem than did the normative hearing population. Subsequent interviews with 30 members of the study sample revealed, however, that many of the deaf students had interpreted the test stimuli peculiarly, thus affecting their scores on the TSCS in a negative manner. It was suggested that questionnaire-type measures of affective variables (or psychological well being) which fail to take into consideration the linguistic and experiential deficits of the deaf respondent may create false impressions of psychological maladjustment. A sample copy of the TSCS is appended.

ED 209 896

The Development of a Cognitive Process Based Learning Strategies Questionnaire.
Long, Gary; and others; April 1978, 58 p.
National Technical Institute for the Deaf,
Rochester, New York.

The study involving 112 deaf undergraduate students at the National Technical Institute for the Deaf (NTID) was designed to review recent educational and psychological literature relating to learning strategy knowledge and use, to determine which cognitive strategies might be most effective for learners, and to pilot a questionnaire for assessing strategy use among deaf students. Through the review of educational and psychological literature, four areas (imagery, questioning, paraphrasing, and understanding concept relationships) were identified as areas in which training students in processing strategies might benefit their comprehension and retention. By developing sets of items, administering them to NTID students, and factor analyzing responses, nine scales were identified that measure students' strategies for processing instructional material. The nine Learning Strategy Questionnaire scales are Study Flexibility, Imagery, Application, Creative Elaboration, Relationships, Understanding, Sign Language and Reinforcement, Ease of Study, and Selection/Retention. Tables with statistical data are appended.

ED 209 895

The Effects of Reviewing Class Notes for Deaf and Hearing Students.
Osguthorpe, Russell T.; and others; April 1978, 22 p.
National Technical Institute for the Deaf,
Rochester, New York

Fifty-three deaf and 33 hearing college students observed a videotaped lecture followed by a 15-minute period of reviewing prepared class notes. Two days later, half of each group again reviewed the notes before taking a test measuring learning outcomes in four areas: recall, recognition, concept acquisition, and problem solving. Multivariate analysis of variance showed that repeated review was much more helpful to deaf students than to hearing students on the recall and recognition measures but not on the higher level learning outcomes. It was further shown that hearing students outperformed deaf students on each of the four dependent measures.

ED 209 876

Readable English for Hearing-Impaired Students: Multi-Level Guidelines for Linguistically Controlled Reading Materials.
Decker, Nan; and others; 1980, 103 p.

Developed by the Multi-level Captioning Project, the manual provides guidelines for linguistically controlling reading materials for the deaf. An introduction describes the three proposed reading levels based on difficulty of vocabulary, syntax, and inference. Chapter 1, on vocabulary, considers word list sources, guidelines for controlling vocabulary, strategies for handling difficult vocabulary, and ways to define words in captioned materials. The second, and major, chapter is on syntax and includes the research basis for the syntax guidelines, approaches to language analysis, and the theoretical foundation of the guidelines. Most of the chapter consists of the specific guidelines concerned with such syntactical structures as determiners; demonstratives and adjectives; verbs and auxiliaries; prepositions, particles, and prepositional adverbs; negatives; questions; comparatives and superlatives; and relative clauses. A chart provides an overview of the syntactical guidelines for common relational words. The third chapter is on inference and includes sections on the role of inference in language comprehension, categories of inference, an example of the use of inference, a perspective on the inferential process, deaf children's inferential abilities, and the guidelines for editing inferential material. The final chapter is on application of the guidelines and considers the editing and evaluation of news reports, basal readers and trade books, documents and instructions, and television scripts.

ED 209 865

Movement Based Language: The Van Dijk Model.
Magin, Kevin D.; May 1979, 10 p.
Paper presented at the Regional Workshop of the
Southeast Regional Center for Deaf-Blind Children,
Nashville, Tennessee, May 6–9, 1979

The paper examines the development of language in the deaf-blind child with emphasis on the child's motoric behavior and imitation as the initial step in language acquisition. Discussed are the following early developmental stages: symbiotic (the close physical and emotional identification of child with the mother-to-be or new mother); resonance (in which the child responds physically to stimulation); and nonrepresentational reference (in which the child learns to identify important objects such as parts of the body). Coactive movement (in which the child and adult explore the child's environment together) should lead to imitation of motoric action and conceptualization. The use of natural gestures by the adult to reinforce communication efforts should lead to use of an arbitrary language system including speech, fingerspelling, reading, and writing.

ED 209 816

Sound Minds in a Soundless World.
Robinson, Luther D.; 1978, 158 p.
National Institute of Mental Health (DHEW),
Rockville, Maryland; Saint Elizabeths Hospital,
Washington, D.C.

Mental health for deaf individuals is promoted through improved and expanded mental health services. To illustrate the psychological, educational, and social implications of deafness, Chapter 1 presents a profile of the deaf individual with emphasis on the communication barriers which exist at each stage of life. Chapter 2 reviews categories of illness (functional psychoses, neuroses, personality disorders and certain other nonpsychotic mental disorders, psychophysiological disorders, transient situational disturbances, and behavior disorders of childhood and adolescence) and considers the relationship between mental illness and deafness in terms of causes and incidence, difficulties of detection, and occurrence of specific types of illness. A third chapter defines four types of therapies and describes ways in which the treatments are adapted to deaf patients with particular reference to the Mental Health Program for the Deaf (MHPD) at Saint Elizabeths Hospital (Washington, D.C.). Theory, purpose, and operating procedures are discussed for psychotherapy (individual, group, and family therapy); behavior therapy/modification; activity therapies, occupational and/or vocational therapies; and somatic therapies (pharmacological and physical therapies). A final chapter focuses on training and research in mental health and deafness with sections on training programs in the MHPD, new directions in academic training programs, and new directions in research.

ED 209 808

The Development of Social-Cognition in Deaf Preschool Children: A Pilot Study.
Young, Edward P.; Brown, S. Lane; March 1981, 8 p.

Social cognitive abilities were evaluated in 23 deaf students (3 to 6 years old) through tasks requiring spatial perspective taking, cooperation, and receptive language. As hypothesized, language ability proved to be a prediction of both other variables, with the high correlation between language and perspective taking indicating a definite relationship. Special difficulties involved in comparative research with deaf and hearing children are noted.

Social Aspects of Deafness

Social Aspects of Deafness explores the implications of deafness from a sociological and anthropological perspective. Written by researchers and professionals who work with deaf people, it adds a new and much needed dimension to the research done by linguists, psychologists, and special educators.

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- Interpersonal Communication and Deaf People
- Deaf People and Social Change

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- "The Interaction of Family and School in Academic Achievement"
- "Diversity within an American Deaf Community"
- "The Socioeconomic Status of Deaf Women: Are They Doubly Disadvantaged"
- "Deaf Persons' Views on English Language Learning. Educational and Sociolinguistic Implications"
- "Assisting Deaf Community Advocacy Groups: Some Guidelines for Professionals"

To order *Social Aspects of Deafness*, send check or money order (U.S. currency) payable to Gallaudet Department of Sociology and Social Work.

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____
Name

____
Organization

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Address

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City State Zip Code

Please Note: Only those orders received prior to May 31, 1983 will be filled.

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Department of Sociology and Social Work
Gallaudet College
800 Florida Avenue, N.E.
Washington, D.C. 20002

Price subject to change without notice.